Ajax/Magnolia Project
Notice of Availability of Engineering Evaluation/Cost analysis
And Administrative Record

Notice is hereby given that the Engineering Evaluation/Cost Analysis (EE/CA) for the Ajax/Magnolia Project and the Administrative Record upon which it is based, are available for public review and comment. The EE/CA was prepared under the Forest Service's authority derived from Section 104 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or Superfund; Title 42, United State Code, section 9604) and Federal Executive Order 12580, and is consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) as found at Title 40, Code of Federal Regulations, Part 300.

The EE/CA describes the Forest Service's preferred Removal Action Option of removing contaminated materials located at the Ajax/Magnolia Mine Sites. The Administrative Record for this response is located at the Umatilla Forest Supervisor's Office, and is available for public inspection during regular business hours and on the Internet at: http://www.fs.fed.us/r6/uma/projects/ . The Forest Service will accept written comments for 30 calendar days from the date of this notice. Upon timely receipt of a request, the comment period will be extended for 15 calendar days. The Forest Service will prepare a written response to significant comments.

The public spokesperson for this action is Greg Visconty, Area Mining Geologist, 1550 Dewey Ave., Baker City, OR 97814, phone: 541-523-1251.

/s/Richard E. Markley 5/2/05
Acting Forest Supervisor
Umatilla National Forest

ENGINEERING EVALUATION/COST ANALYSIS

Engineering Evaluation/Cost Analysis of the Ajax and Magnolia Mines Umatilla National Forest, Oregon

Prepared For:

USDA Forest Service
Umatilla National Forest
3160 NE 3rd Street, Box 490
Prineville, Oregon 97754-0490

Prepared by:

Millennium Science and Engineering, Inc.
1605 North 13th Street
Boise, Idaho 83702
(208) 345-8292

Principal Author: Michael Lee May, Project Manager

Technical Reviewer: Michael J. Puett, P.E.

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ACRONYMS AND ABBREVIATIONS

µg/L	Microgram per liter
mg/kg	Milligram per kilogram
ABA	Acid Base Accounting
AGP	Acid Generating Potential
amsl	Above mean sea level
ANP	Acid Neutralizing Potential
APA	Abbreviated Preliminary Assessment
ARAR	Applicable or Relevant and Appropriate Requirements
BAT	Best Available Technology
bgs	Below ground surface
BPT	Best Practicable Technology
BLM	United States Bureau of Land Management
CDI	Chronic daily intake
CERCLA	Comprehensive Emergency Response, Compensation & Liability Act
CFR	Code of Federal Regulations
COI	Contaminant of interest
COPC	Contaminant of potential concern
CPEC	Contaminant of potential ecological concern
CTE	Central tendency exposure
cy	Cubic yard
EA	EA Engineering, Science, and Technology, Inc.
ECR	Excess cancer risk
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
EPC	Exposure point concentration
ERA	Ecological Risk Assessment
ESU	Evolutionarily Significant Unit
FR	Forest Road
gal	Gallon
gpm	Gallon per minute
HDPE	High density polyethylene
HHRA	Human Health Risk Assessment
HI	Hazard Index
HQ	Hazard Quotient
IEUBK	Integrated Exposure Uptake Biokinetic
MCL	Maximum Contaminant Level (in drinking water)
MDC	Maximum detected concentration
MSE	Millennium Science and Engineering, Inc.
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NFS	National Forest System
NNP	Net Neutralization Potential
NWS	National Weather Service
O&M	Operations and Maintenance
OAR	Oregon Administrative Rules
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ONHIC	Oregon Natural Heritage Information Center
ORNHP	Oregon Natural Heritage Program

ACRONYMS AND ABBREVIATIONS (continued)

ORNL	Oak Ridge National Laboratory
PRG	Preliminary Remediation Goal
PRP	Potentially responsible party
RAGS	Risk Assessment Guidance for Superfund
RAO	Removal Action Objective
RfD	Reference dose
RI/FS	Remedial Investigation/Feasibility Study
RMC	Risk Management Criteria
RME	Reasonable maximum exposure
SF	Slope factor
sf/gpm	Square foot per gallon per minute
SI	Site Inspection
SOC	Species of concern
SPLP	Synthetic Precipitation Leaching Procedure
SRB	Sulfate–reducing bacteria
SVL	Screening level value
sy	Square yard
T&E	Threatened and endangered
TAL	Target Analyte List
TSDF	Treatment, Storage or Disposal Facility
UCL_{90}	90 percent Upper Confidence Limit
USCB	United States Census Bureau
USFS	United States Forest Service
USGS	United States Geological Survey
XRF	X-Ray Fluorescence

EXECUTIVE SUMMARY

An Engineering Evaluation/Cost Analysis was performed for a proposed CERCLA removal action at the Ajax and Magnolia Mines. These inactive gold mines are located on the Umatilla National Forest, about 3.5 miles north of Granite, Oregon. The stream (Lucas Gulch) adjacent to the mines is considered a sensitive ecosystem, because of their spawning and rearing and migratory pathway characteristics for federally–listed bull trout and steelhead. Associated wetlands are also considered sensitive ecosystems.

Most data regarding site contaminants was provided by previous investigations. The data were supplemented with analyses of several waste rock samples collected and analyzed as a part of the current study.

A streamlined Human Health Risk Assessment conducted for this EE/CA examined risks for adult and child recreationists and adult workers under both Central Tendency Exposure and Reasonable Maximum Exposure scenarios. Arsenic exceeds Oregon's acceptable excess lifetime cancer risk of 1.E-05 for all receptors, and presents carcinogenic risks to all receptors. Manganese also contributes to the cumulative hazard, but exposure to manganese alone presents a Hazard Quotient <1.E+00.

A streamlined Ecological Risk Assessment conducted as part of this EE/CA examined risks to plants, invertebrates, birds, mammals and aquatic life from four media: soil/waste rock, surface water, sediment and pore water. Seventeen metals present risk to one or more of the examined ecological receptors: arsenic, mercury, aluminum, antimony, cadmium, chromium, copper, lead, manganese, nickel, selenium, silver, thallium, vanadium, zinc, barium and iron.

Four removal action alternatives were evaluated:

- Alternative 1 – No Action
- Alternative 2 – Excavation and Off-site Disposal
- Alternative 3 – Excavation and On-site Disposal
- Alternative 4 – Adit Discharge Treatment

The preferred alternative consists of a combination of Alternatives 3 and 4. Approximately 4,300 cubic yards (cy) of mine waste exceeding the arsenic site cleanup level (152 milligrams per kilogram) would be excavated and disposed of in an on-site repository. An additional 330 cubic yards of waste rock would be placed in collapsed shafts or adits. Physical hazards would be addressed by installing bat gates in the open adits and backfilling collapsed adits and shafts. The backfilled areas and excavated waste areas would be covered with topsoil, seeded, and mulched. Trees and brush cleared at the site would be used to generate mulch and cover for seeded areas. The cabins (one standing and one collapsed) would be demolished and all woody debris would be buried on-site in the repository and collapsed shafts, or burned on site. Sediment ponds would be constructed to treat a total of the up to 35,000 gallons per day of discharge from open adits at each site. Effluent from the sediment ponds would be monitored to assess water quality. If metal concentrations continue to exceed cleanup levels, aerobic wetlands would be constructed adjacent to the sediment ponds to provide additional treatment.

The total estimated cost for the preferred alternative is $217,933 for the Ajax site and $402,035 for the Magnolia site. Implementing concurrent removal actions at both sites would reduce overall total costs because of economies of scale and shared resources. The estimated cost for an aerobic wetland, if needed, is $58,146 for Ajax and $75,888 for Magnolia.

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1.0 INTRODUCTION

Millennium Science and Engineering, Inc. (MSE) has been contracted by the U.S. Department of Agriculture Forest Service (USFS) to perform an Engineering Evaluation/Cost Analysis (EE/CA) for a contemplated non-time critical removal action at the Ajax and Magnolia Mines ("the site") on the Umatilla National Forest. This investigation was performed under Hazardous Waste Remediation Services Contract 53-05K3-4-0024.

This investigation is directed at supporting the selection of a removal action alternative under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). The USFS has authority to act as the lead agency under CERCLA on lands that it administers (Executive Order 12580). The current investigation constitutes a Removal Site Evaluation under the implementing regulations (National Oil and Hazardous Substances Pollution Contingency Plan [NCP], 40 Code of Federal Regulations [CFR] 300.410).

The purpose of a removal action is to "abate, prevent, minimize, stabilize, mitigate or eliminate the release or the threat of a release" (40 CFR 300.415). The EE/CA for a removal action is intended to: (1) satisfy environmental review requirements for removal actions; (2) satisfy administrative record requirements for unproved documentation of removal action selection; and (3) provide a framework for evaluating and selecting alternative technologies. To meet those purposes, this EE/CA identifies objectives for the removal action and evaluates the effectiveness, implementability, and cost of various alternatives that may satisfy these objectives. The objective of sample collection and analysis is to provide sufficient data to support the EE/CA, primarily for evaluation of alternatives. The primary source of data used to evaluate site conditions and potential human health and ecological risks at the Ajax and Magnolia Mines included data gathered during site visits by MSE and information provided in the Site Inspection (SI) report by EA Engineering, Science, and Technology, Inc. (EA 2004). Additional data sources are discussed in Section 2.3.

This report summarizes the known information about the site and its contamination, outlines the result of the streamlined risk assessments, identifies cleanup criteria and removal action objectives, summarizes a comparison of removal action alternatives and presents a preferred alternative. Appendices present the details of the human health and ecological risk assessments, a list of applicable or relevant and appropriate requirements (ARARs), and a cost analysis.

2.0 SITE CHARACTERIZATION

The Ajax and Magnolia Mines are in very close proximity to each other and share many similarities. Therefore, for the purposes of this EE/CA, the two mines were considered as one project site. The following sections discuss the site location and description, background, previous investigations, and current environmental conditions. More detailed information regarding the operational history, site geology, hydrogeology, and hydrology is presented in the SI report (EA 2004).

2.1 Site Location and Description

The Ajax and Magnolia Mines are in Grant County, Oregon, near the town of Granite, at an approximate elevation of 5,300 feet above mean sea level (amsl) (Figure 1). Both mines are in the Umatilla National Forest and are located in Lucas Gulch, about 3.5 miles north of Granite (Figure 2). Both mines are located in Section 22, Township 8 South, Range 35.5 East (U.S. Geological Survey [USGS] 1995). Lucas Gulch

flows into Granite Creek about 0.5 mile west of the site. The site is accessed through a locked gate on Forest Road (FR) 580, via Granite Creek Road (County Road 73). Photographs of the site are provided in the SI Report (EA 2004). The following paragraphs describe the features at each mine.

Ajax Mine

The Ajax Mine is approximately 0.5 miles from the locked gate at County Road 73. The mine covers approximately 3 acres and is situated on a steep hillside adjacent to the east side of Lucas Gulch. The mine, shown in Figure 3, is currently inactive and consists of 1 intact adit and 3 collapsed adits, 1 collapsed vertical shaft, 1 settling pond, 3 large waste rock piles, and several smaller scattered waste rock piles.

Magnolia Mine

The Magnolia Mine is located further up Lucas Gulch along FR 580, about 1,500 feet from the Ajax Mine. There is a locked gate separating the two mine sites. The mine covers approximately 8 acres and is situated on flat to moderate slopes primarily on the east side of Lucas Gulch with a few workings across the stream on the west side of Lucas Gulch. There is a standing wooden cabin and collapsed wooden cabin on site and currently eight active claims. However, according to USFS personnel, operations are limited to periodic maintenance of the site. The mine, shown in Figure 4, consists of 2 open adits and 3 collapsed adits, 1 collapsed vertical shaft, 2 settling ponds, 10 waste rock piles, and several scattered piles of wood and metal debris.

2.2 Site Background and History

Mining in the Granite Mining District started in the 1860s and the first claims at the Ajax and Magnolia Mines were filed in 1895. Several claims were established at both mines between 1895 and 1902 (EA 2004). A 10-stamp mill was reportedly constructed at the Magnolia Mine in 1899 and a 5-stamp mill was constructed at the mouth of Lucas Gulch near Granite Creek in 1916 (EA 2004). Mining operations consisted primarily of underground workings and continued sporadically until approximately 1951. Four claims at the Magnolia Mine are reportedly still active and have been maintained with Grant County and the Bureau of Land Management (BLM) (EA 2004). The SI report contains more detailed information regarding the site history and claim status (EA 2004).

2.3 Previous Site Investigations

The following sections summarize previous investigations of the Ajax and Magnolia Mines. More detailed information is presented in the individual investigative reports and the SI (EA 2004). Previous investigations at the site include:

- Site Investigation by the U.S. Environmental Protection Agency (EPA 1996)
- Abbreviated Preliminary Assessment (APA) by the USFS (2002a)
- SI by EA (EA 2004)

2.3.1 Environmental Protection Agency Site Investigations

The EPA completed investigations of 12 mine sites located within the Granite Creek Watershed in October 1996, including the Ajax and Magnolia Mines (EPA 1997a). Surface water and sediment samples were collected from both mines and analyzed for metals. Sample locations included the adit portals, settling ponds, and upstream, on-site, and downstream locations in Lucas Gulch. The results were evaluated against media-specific screening guidelines, including the severe and low effect levels of the Ontario Sediment Quality Guidelines, two sets of criteria based on Apparent Effects Thresholds developed by the EPA and State of Oregon, and EPA ambient water quality criteria (EPA 1997b). Several metals detected in the sediment samples from the Ajax-Magnolia site exceeded at least one of the four guidelines, including: arsenic, cadmium, cobalt, copper, chromium, cyanide, lead, magnesium, manganese, mercury, nickel, selenium, silver, and zinc. In surface water samples from the Ajax-Magnolia site, only arsenic exceeded guideline concentrations.

2.3.2 Forest Service Abbreviated Preliminary Assessment

The USFS conducted an APA of the Ajax and Magnolia Mines in 2002 to determine whether the potential existed for a release of hazardous contaminants to the environment, and to further characterize the site. A visual inspection was conducted and samples from waste piles were field analyzed using a Niton 700 series X-Ray Fluorescence (XRF) analyzer. Arsenic and iron were the only metals found to exceed EPA Region 9 Preliminary Remediation Goals (PRGs) (USFS 2002a and 2002b). No other sampling was performed.

2.3.3 Site Inspection

An SI of the Ajax and Magnolia Mines was completed by EA in January 2004 to determine whether mining wastes at the site pose an immediate or potential threat to human health and the environment and to collect information to support a decision regarding the need for a removal action. Surface and subsurface soil, sediment, surface water, pore water, plant tissue, and benthic macroinvertebrate samples were collected and analyzed for metal concentrations. The analytical results were compared to state and federal human health and ecological screening criteria to identify contaminants of interest (COI) at the site. Results indicated that several metals, particularly arsenic, exceeded both human health and ecological screening criteria in surface water, soils, and sediment. The SI concluded that an EE/CA should be performed and include a risk evaluation to assess potential human and ecological impacts, establish site removal cleanup standards, and evaluate remedial alternatives. The SI report provided much of the information discussed in this EE/CA (EA 2004).

2.4 Climate and Meteorology

The Oregon Climate Service places the project site in Oregon Climate Zone 8 (Northeastern zone). In this zone, the coldest winter temperatures occur in the valleys. The mean length of time between freezing temperatures is less than 6 weeks at Seneca, Austin and Ukiah (Oregon Climate Service 2004).

The nearest National Weather Service (NWS) station is Granite 4 WSW, located about 6 miles southwest of the project site, at an elevation of 4,940 feet amsl. This site was part of the NWS Cooperative Observer Program, and operated for 19 years, from July 2, 1948 through October 16, 1967. Selected data are presented in Table 1. During the 19 years of operation, the average annual precipitation was 26.37 inches,

mostly in the form of snowfall. The average annual snowfall was 174 inches, with snow on the ground generally from November through May (Western Regional Climate Center 2004).

2.5 Geology and Hydrogeology

The site geology and groundwater hydrology are discussed in the SI. No additional information was obtained for the EE/CA.

2.6 Hydrology

The main open adits at the Ajax and Magnolia Mines are located at elevations of 5,240 and 5,300 feet amsl, respectively, in the North Fork of the John Day watershed (Hydrologic Unit Code 17070202). Both mines are adjacent to Lucas Gulch, which flows south into Granite Creek, about 2,200 feet downstream of the Ajax adit. Granite Creek flows 3.5 miles south to the confluence with Bull Run at the Granite town site. Granite Creek turns sharply northwest at this point, and flows 38 miles to its confluence with the North Fork of the John Day River. The entire watershed area of Lucas Gulch covers 563 acres, most of which is above the Ajax adit. There are no USGS stream gauges on Lucas Gulch. The nearest USGS gauges are on Granite Creek near Dale, about 30 air miles from the site (USGS 2004).

Lucas Gulch has not been identified by the State as having impaired water quality. It does not appear on the 2002 edition of the "303(d) list," so named in reference to section 303(d) of the federal Clean Water Act (EPA 2004, Oregon Department of Environmental Quality [ODEQ] 2004). Granite Creek is listed as impaired by temperature from river mile 11.2 to 0, and by sedimentation from river mile 16.2 to 11.2. Since these segments are 25 miles below the Ajax and Magnolia Mines, conditions at the mines are presumed to be unrelated to the 303(d) listing.

2.7 Surrounding Land Uses

Land uses in areas surrounding the site include mining, timber harvesting and recreational activities, such as hiking, camping, and hunting. The town of Granite is about 3.5 miles from the site and has approximately 24 inhabitants (U.S. Census Bureau [USCB] 2002). According to the SI, approximately 50 permanent residents reside within a 4-mile radius of the site. The nearest building is a small cabin located about 0.5 miles from the Ajax-Magnolia site, although it is unknown whether this cabin is occupied on a regular basis. There are no designated, developed campsites in the area; however, there are numerous dispersed campsites, typically consisting of a parking spot and a fire ring, located along open roads. There are no commercial fishing activities in the area and the Oregon Department of Fish and Wildlife (ODFW) prohibits all recreational fishing in Granite Creek and its tributaries to protect Chinook salmon (EPA 1997a).

2.8 Sensitive Ecosystems

For the purposes of this EE/CA, sensitive ecosystems include sensitive environments and threatened and endangered (T&E) species, which are discussed in the following sections.

2.8.1 Sensitive Environments

According to Oregon Administrative Rule (OAR) 340-122-045, a sensitive environment is "*an area of particular environmental value where a hazardous substance could pose a greater threat than in other non-sensitive areas. Sensitive environments include but are not limited to: critical habitat for federally endangered or threatened species; National Park, Monument, National Marine Sanctuary, National Recreational Area, National Wildlife Refuge, National Forest Campgrounds, recreational areas, game management areas, wildlife management areas; designated federal Wilderness Areas; wetlands (freshwater, estuarine, or coastal); wild and scenic rivers; state parks; state wildlife refuges; habitat designated for state endangered species; fishery resources; state designated natural areas; county or municipal parks; and other significant open spaces and natural resources protected under Goal 5 of Oregon's Statewide Planning Goals*."

Based on this definition, sensitive environments within the locality of the site include:

- Jurisdictional wetlands identified in the wetlands assessment conducted as part of the SI (EA 2004); and
- Lucas Gulch and Granite Creek because of their spawning and rearing and migratory pathway characteristics for federally-listed species (bull trout and steelhead).

Jurisdictional wetlands in the vicinity of the site include wet meadows at the north end of the Magnolia Mine, a small wetland at the base of Ajax waste rock pile (WP-11), and a scrub-shrub wetlands at the confluence of Lucas Gulch and Granite Creek. The SI report contains a more detailed discussion of the wetlands assessments conducted at the site (EA 2004).

No aquatic habitat surveys were conducted as part of this EE/CA; however, limited surveys were conducted during the SI (EA 2004). In summary, habitat in Granite Creek and Lucas Gulch was reported to be in good to excellent condition. Fish species recorded during visual inspections included redband trout (*Oncorhynchus mykiss*) and potentially westslope cutthroat trout (*Oncorhynchus clarki*). Both species are federally listed as species of concern (SOC). The SI report contains a more detailed description of the aquatic survey results (EA 2004).

2.8.2 Threatened and Endangered Species

A list of T&E wildlife species and SOC potentially occurring in Grant County was obtained from the Oregon Natural Heritage Program (ORNHP 2001). In addition, the Oregon Natural Heritage Information Center (ONHIC) was contacted regarding records of rare and T&E species occurrences within a 2-mile radius of the site. Information from the ONHIC indicate the following species have been documented within a 2-mile radius of the site:

<u>Federal Species Listed as Threatened:</u>

- *Oncorhynchus mykiss* (Steelhead – Middle Columbia River Evolutionarily Significant Unit (ESU), summer run)
- *Salvelinus confluentus* (Bull Trout – Columbia River population)

<u>Federal Species Listed as Candidate:</u>

- *Rana luteiventris* (Columbia spotted frog)

No terrestrial or aquatic T&E or rare species were observed during the site visit conducted by MSE in September 2004. Similarly, no T&E species were reportedly observed by EA personnel during the SI; however, redband trout (*Oncorhynchus mykiss*), a federal SOC in Lucas Gulch, were observed (EA 2004). A more complete list of species observed by EA during the SI is presented in the SI report (EA 2004).

2.9 Source, Nature and Extent of Contamination

A total of 38 samples were collected from the Ajax-Magnolia site during the SI consisting of 33 investigative samples and 5 background samples. The investigative samples were collected from areas of suspected contamination and included 9 surface water samples, 3 pore water samples, 7 sediment samples, 9 soil samples, and 5 plant tissue samples. Four benthic macroinvertebrate samples were also collected at the site. Background samples were collected from two locations in Lucas Gulch and two locations in the Granite Creek drainage (upstream and downstream of the confluences with Lucas Gulch). Soil and plant reference samples also were collected from the Granite Creek watershed by EA during the Granite Creek SI. MSE collected six additional investigative soil samples from waste rock piles during the September 2004 site visit.

The two background sample locations in Lucas Gulch are upstream of mining disturbances and are considered to be representative of background conditions for the Ajax-Magnolia site. However, samples collected from the Granite Creek drainage were not considered representative of site conditions and were not considered in the human health or ecological risk assessments. Therefore, the background sample data set is very limited and consists of: 1 soil and 1 plant sample from a single location (LUCA-19) on the east side of Lucas Gulch, about 500 feet north of the main adit; and 1 surface water sample, 1 sediment sample, and 1 pore water sample from a single location (MAGN-01) in Lucas Gulch, upstream of the Magnolia Mine. The sample locations are shown on Figures 3 and 4.

All samples were submitted to a laboratory for analysis of metals and associated parameters. The analytical results were compared to state and federal human health and ecological screening criteria to identify COIs at the site that may pose potential risk to human health or the environment.

The following sections describe the sources, nature, and extent of environmental contamination at the Ajax and Magnolia Mines based on information gathered during the SI, visual observations, and sample results.

2.9.1 Soils and Waste Rock

A total of 15 surface soil, subsurface soil, and waste rock samples were collected from several locations at both mines. Of the 15 samples, 9 were collected during the SI and 6 were collected by MSE in September 2004. The SI samples consisted of grab samples collected at depths ranging from 0.3 to 3 feet below ground surface (bgs); MSE samples included grab and composite samples collected at depths ranging from 0.3 to 1 foot bgs. Of the nine samples collected during the SI, one was collected from an undisturbed area in Lucas Gulch (LUCA-19) presumed to be representative of background conditions for the site. The remaining eight samples were collected directly from waste piles or suspected areas impacted from mining operations. The sample locations are shown on Figures 3 and 4.

Soils samples were submitted to a laboratory for analysis of pH, Target Analyte List (TAL) metals, chromium VI, and cyanide. Acid Base Accounting (ABA) parameters and Synthetic Precipitation Leaching Procedure (SPLP) parameters were also included, as appropriate. The results indicate that several metals in soils at the site exceed both human health and ecological screening criteria. Metals

exceeding EPA Region 9 PRGs for industrial soil included arsenic, iron, lead, and manganese. The most significant ecological exceedances were arsenic, chromium (total), iron, mercury, and vanadium. The SI soil sample analytical results are available in the SI Report (EA 2004), and results of soil samples collected by MSE are presented in Table 2.

ABA tests were conducted on the SI soil samples to determine the potential for acid generation from the waste rock. In these tests, a sample's Acid Generating Potential (AGP) is calculated from its pyritic sulfur (*i.e.*, sulfide) content and the Acid Neutralizing Potential (ANP) is measured from its ability to react with acid. The net result is the sample's Net Neutralization Potential (NNP). Negative NNP values indicate a potential for acid generation. NNP values below –20 indicate a strong potential for acid generation and values above 20 indicate the material is unlikely to form acid; values between –20 to 20 fall in a zone of uncertainty and require kinetic testing to predict acid generation. NNP values from investigative soil samples collected at the site ranged from –17.8 to 66.0; the single background soil sample has an NNP value of –6.0. None of the NNP values were less than –20 and most of the values were in the zone of uncertainty between –20 and 20. Based on the soil NNP values, acid generation seems unlikely but kinetic testing may be required for a more accurate prediction.

Results from the single background soil sample also exceeded several human health and ecological screening criteria, including arsenic, barium, mercury, and selenium. However, nearly all metals at the other sample locations were significantly elevated above the background concentrations. In general, the highest metals concentrations were in samples collected primarily from the waste piles adjacent to, or near the main adits at both mines, and from piles surrounding the settling ponds at both mines. A summary of critical COI concentrations in the waste rock piles and the estimated volume of each pile are presented in Table 3.

2.9.2 Surface Water

A total of 10 surface water samples were collected from the site during the SI, including 9 investigative samples and 1 background sample. The reader is referred to the SI for details. Sample locations are shown on Figures 3 and 4.

The results indicate that several metals in surface water at the site exceed both human health and ecological screening criteria. Metals exceeding EPA Region 9 Tap Water PRGs included arsenic, lead, manganese, and thallium. The most significant ecological exceedances were aluminum, barium, iron, and manganese. Results from the single background sample exceeded ecological screening criteria for barium. Nearly all metals at the investigative sample locations were significantly elevated above the background concentrations. These results indicate an ongoing release of metals from both mines to surface water at the site. In general, the highest metals concentrations were in samples collected primarily from the adit discharges at both mines. The adit discharge pH values ranged from 7.3 to 8.0 and the other surface water pH values ranged from 8.1 to 8.7.

Based on the field water quality parameters, there does not appear to be a limiting factor that would preclude sustainable benthic macroinvertebrate and fish communities at any of the stream sample locations.

2.9.3 Sediment and Pore Water

Sediment and pore water samples were collected during the SI. The sample locations are shown on Figures 3 and 4. Overall, these results indicate that sediment at the site is being impacted by an ongoing release of metals from both mines at the site, particularly in the adit discharges and settling ponds.

Analytical results of the sediment samples indicate that several metals in sediment at the site exceed both human health and ecological screening criteria. Metals exceeding EPA Region 9 industrial soil PRGs included arsenic, iron, and manganese. The most significant ecological exceedances were arsenic, cadmium, copper, manganese, mercury, nickel, selenium and zinc. In the single background sediment sample, metals that exceeded the ecological screening criteria were nickel, cadmium, copper, selenium and zinc. Nearly all metals at the investigative sample locations were significantly elevated above the background concentrations. The percentage of fines was significantly higher in the ponds (86 to 93 percent) than in Lucas Gulch (primarily sands and gravel).

The pore water analytical results indicate that only barium concentrations in pore water exceeded ecological screening criteria, including in the single background sample. In general, nearly all metals at the other sample locations were significantly elevated above the background concentrations.

2.9.4 Plants

Plant tissue samples were collected and described in the SI. No additional information was obtained for the EE/CA. Analytical results from the plant samples are available in the SI.

In general, concentrations of aluminum, arsenic, calcium, iron, and magnesium were higher than background values. Antimony, arsenic, cobalt, and mercury were not detected in the background sample. Visual comparisons indicated potential toxicity or lack of nutrients and stunted growth in plants collected in the waste rock piles and areas surrounding the settling ponds.

2.9.5 Groundwater

Groundwater conditions at the site are not well documented and no groundwater samples were collected during the SI. However, according to the SI report, "no release of hazardous substances from either mine site to local groundwater systems is suspected." There are no uses of groundwater at the site and the nearest well is located over 3 miles from the site. The well was reportedly completed to a depth of 340 feet (EA 2004). Based on the distance from the site and depth of the well, it is very unlikely that this well could be impacted from groundwater coming from the site. Therefore, the groundwater pathway appears to be incomplete and characterization of the groundwater is not warranted.

2.9.6 Air

Air quality at the site has not been characterized and no air samples were collected during the SI. The most likely source of air contamination at the site is windblown dust particulates from the waste rock piles. Because arsenic concentrations in the waste rock exceed EPA's soil screening level for inhalation of particulates, the air pathway is considered complete. However, removal or containment of the waste rock will eliminate the source of contaminants and render the pathway incomplete. Therefore, characterization of air quality at the site is not warranted assuming the waste rock is addressed.

3.0 STREAMLINED RISK EVALUATION AND ASSESSMENT

Streamlined human health and ecological risk assessments were completed for the Ajax-Magnolia site. The human health risk assessment (HHRA) is provided as Appendix A, and the ecological risk assessment (ERA) is provided as Appendix B. Both assessments are discussed in the following sections.

3.1 Streamlined Human Health Risk Assessment

A streamlined HHRA was conducted to assess and evaluate potential risks associated with exposure to mining-related contaminants at the Ajax-Magnolia site. The HHRA evaluated potential impacts to human health resulting from exposure to site-related contaminants of potential concern (COPCs) in surface and subsurface soils, sediment, and surface water at the site. The results were used to identify areas and media posing significant risks and to assist in the development and evaluation of remedial alternatives to mitigate potential impacts. For the purposes of this risk assessment, both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios were evaluated. The RME scenario is intended to be a very conservative estimate of potential exposure at the site while the CTE scenario is typically more realistic. The risk assessment was completed in accordance with OAR 340-122-084, ODEQ's Guidance for Deterministic Human Health Risk Assessment (ODEQ 2000), and EPA Risk Assessment Guidance for Superfund (RAGS), Volumes 1 and 2 (EPA 1991).

The following sections briefly discuss the risk assessment methodology and assumptions, and summarize the estimated human health risks and hazards. A more detailed discussion of the HHRA is provided in Appendix A.

3.1.1 Data Summary and Evaluation

Data used in the HHRA consisted of analytical results from: (1) soil, sediment, and surface water samples collected during the SI; and (2) soil samples collected by MSE in September 2004. All data were assumed to be of sufficient quality for the purposes of this risk assessment. Because of the limited analytical data and the proximity and similarity of the Ajax and Magnolia Mines, data from both sites were combined for all media and evaluated as one site.

3.1.2 Potential Receptors and Exposure Routes

Because of the remote location and restricted access to the site, potential uses are limited and long-term exposure to contaminants at the site is unlikely. Recreational use appears to be limited to hunters and hikers that traverse the site. However, current land use includes active mining claims at the Magnolia Mine although activities are believed to be limited to maintenance of the site and there is no visible evidence of active or periodic mining operations. Therefore, the potentially exposed populations evaluated in this risk assessment include: (1) adult recreationist, (2) child recreationist, and (3) adult worker. Based on the potentially exposed populations, exposure pathways evaluated in this risk assessment include:

- Incidental ingestion of soil and sediment
- Ingestion of surface water
- Dermal contact with soil, sediment, and surface water

- Inhalation of soil particulates

Other potentially complete pathways, such as fish, groundwater, and plant ingestion, were qualitatively considered but not quantified as discussed in Appendix A.

3.1.3 Contaminants of Potential Concern

COPCs are compounds at the site that exceed risk-based screening levels and are used to evaluate potential risks to human receptors. Analytical data from the site for each media were screened on the basis of detection frequency, background levels, and regulatory criteria to identify site-specific COPCs for use in the risk assessment. Based on the results of the screening process, the compounds presented in Table 4 were identified as COPCs for the Ajax-Magnolia site.

3.1.4 Exposure Point Concentrations

Exposure point concentrations (EPCs) were developed from site-specific data and represent the concentration of each COPC that a receptor will potentially contact during the exposure period. For the RME scenario, ODEQ guidance recommends using the 90 percent upper confidence limit (UCL_{90}) of the arithmetic mean because of the uncertainty associated with estimating the true average concentration at a site (ODEQ 2000). However, data sets with fewer than 10 samples can provide statistically unreliable estimates of the true mean. The EPA recommends using the maximum detected concentration (MDC) for data sets with less than 10 samples. Because soil is the only media at the site with more than 10 investigative samples collected, UCL_{90} values were calculated and used for soil and MDCs were used for sediment and surface water. Under the CTE scenario, the arithmetic mean concentration is used as the EPC for all media. The EPCs used in the Ajax-Magnolia HHRA are summarized in Table 5.

3.1.5 Hazard and Risk Estimates

Potential human health impacts associated with exposure to COPCs at the Ajax-Magnolia site were evaluated by estimating both non-carcinogenic and carcinogenic effects. Non-carcinogenic hazards were evaluated by comparing estimated chronic daily intakes (CDIs) to EPA-established reference doses (RfD). RfDs represent route-specific estimates of the safe dosage for each COPC over a lifetime of exposure. Chronic RfDs were used in this HHRA and represent the highest average daily exposure to a human receptor that will not cause deleterious effects during their lifetime. The ratio of the estimated CDI to the RfD is the Hazard Quotient (HQ). HQs are calculated for each COPC with an established RfD. For exposure to multiple COPCs, the individual HQs are summed for all contaminants in each exposure pathway to determine the Hazard Index (HI). HQs or HIs greater than 1.E+00 indicate the potential for adverse health effects because the estimated intake exceeds the RfD.

The carcinogenic risk from exposure to a COPC is expressed in terms of the probability that an exposed receptor will develop cancer over his lifetime. Carcinogenic risks are estimated by multiplying the CDI by Slope factors (SFs) developed by the EPA. The SFs convert the CDI, averaged over a lifetime of exposure, to a risk of developing cancer, commonly referred to as the excess cancer risk (ECR). SFs are chemical– and route–specific and represent an upper bound individual excess lifetime cancer risk.

The EPA does not currently provide toxicological data for lead, and RfDs and SFs have not been established for assessing hazard and risk from exposure to lead. However, EPA has developed the Integrated Exposure Uptake Biokinetic (IEUBK) model to assess lead exposures to children 7 years of

age and less. The model does not assess lead intakes for older children or adults because younger children are the most sensitive receptors to the non-carcinogenic effects of inorganic lead. Because of the low probability of such a receptor being exposed to lead at the site, and because of the significant risks associated with arsenic levels, exposure to lead was not quantitatively evaluated in this HHRA. However, lead concentrations at the site were compared with EPA screening criteria and Risk Management Criteria (RMC) developed by the BLM to identify areas and media posing potential risks from exposure to lead at the Ajax-Magnolia site.

Non-carcinogenic hazard and carcinogenic risks were calculated for all receptors using both RME and CTE scenarios. The RME scenario uses very conservative assumptions and represents the maximum potential exposure that could occur at a site. RME estimates typically provide the basis for developing protective exposures for future land uses. The CTE scenario employs more realistic assumptions and is usually considered more representative of actual exposures.

The estimated non-carcinogenic hazards and carcinogenic risks from exposure to COPCs at the Ajax-Magnolia site are discussed in the following sections and summarized in Table 6.

3.1.5.1 Summary of Non-carcinogenic Hazards

The estimated non-carcinogenic hazards were compared to the ODEQ acceptable hazard index of less than or equal to 1 (HI = 1.E+00) (ODEQ 2000). The results indicate no non-carcinogenic hazards to receptors under the CTE scenario, and only marginal hazards to the child recreationist (HI = 4.E+00) under the RME scenario. The primary exposure pathways are dermal contact and ingestion of arsenic in soil. Non-carcinogenic hazards associated with ingestion of and dermal contact with surface water and sediment, and inhalation of soil particulates, were all below the acceptable level. Therefore, inhalation of particulates and exposure to surface water and sediment at the site do not pose significant non-carcinogenic hazards to receptors.

Although manganese contributes to the total cumulative hazards, the HIs from exposure to manganese were all less than 0.05 for all receptors under both the CTE and RME scenarios. Therefore, manganese is not considered a significant human health contaminant at the site.

3.1.5.2 Summary of Carcinogenic Risks

Of the human health COPCs evaluated in this HHRA, arsenic is the only carcinogen for which cancer risks were estimated; lead may also be considered a carcinogen but cancer risks cannot be quantified for lead. Therefore, the estimated carcinogenic risks were compared to the ODEQ acceptable risk level of less than or equal to one in one million (ECR $\leq$ 1.E-06) for exposure to a single carcinogen (ODEQ 2000). The results indicate marginal carcinogenic risks to the adult worker (ECR = 2.E-06) and child recreationist (ECR = 6.E-06) under the CTE scenario, and significant carcinogenic risks to all receptors under the RME scenario (ECRs = 2.E-05 to 2.E-04). The primary exposure pathway is ingestion of arsenic in soil, sediment, and surface water.

Carcinogenic risks associated with inhalation of soil particulates were below the acceptable level for all receptors under both the CTE and RME scenarios. Also, carcinogenic risks from dermal exposure to surface water only marginally exceeded the acceptable level for the worker (ECR = 2.E-06). Therefore, inhalation of particulates and dermal exposure to surface water at the site do not pose significant carcinogenic risks to receptors.

3.1.5.3 Lead Risks

Lead was identified as a COPC in soils at the Ajax Magnolia site because the results of one sample (1,210 milligram per kilogram [mg/kg]) exceeded the EPA industrial soil PRG of 800 mg/kg. Lead also was retained as a COPC in surface water because of the lack of EPA screening criteria for water.

The EPA has not specified a hazardous waste threshold value for total lead in soil and they have not established a drinking water Maximum Contaminant Level (MCL) for lead; however, they suggest lead screening levels of 400 mg/kg for residential soils and 15 micrograms per liter (µg/L) for drinking water. All surface water results were well below the suggested drinking water screening level and only two soil samples exceeded the residential soil screening level. The BLM RMC for lead in soils for a camper receptor is 1,000 mg/kg (BLM 1996). Therefore, there appears to be only isolated risks from exposure to lead in soils at the site.

3.1.5.4 Hotspot Assessment

OAR 340-122, commonly referred to as the Environmental Cleanup Rules, requires specific actions for "hot spots" of contamination. Those actions are: (1) identify hot spots during the Remedial Investigation/Feasibility Study (RI/FS); and (2) treat the hot spots, to the extent possible, as part of ODEQ-approved remedial activities at the site. Hot spots are defined as areas where the contamination is highly concentrated, highly mobile, or cannot be reliably contained. The general intent of this rule is to require treatment of the most contaminated areas rather than the entire site and is based on the premise that at most sites, a small percentage of the area contributes to a large percentage of the overall contamination.

Because of the high levels of arsenic in soils at site, an assessment of highly concentrated hot spots was conducted by comparing arsenic concentrations in soil samples to an estimated risk-based hot spot concentration. An arsenic hot spot concentration of 1,521 mg/kg in soil was back-calculated based on a lifetime ECR of 1.E-04 for the most sensitive receptor (adult worker). Soil samples from only two waste piles exceeded the hot spot concentration: WP-4 at Magnolia (3,730 mg/kg), and WP-11 at Ajax (1,750 mg/kg). Therefore, these two waste piles are considered hot spots based on arsenic concentrations in the soil.

3.2 Streamlined Ecological Risk Assessment

A screening level ERA was conducted to assess and evaluate potential ecological risks associated with exposure to mining-related contaminants at the site (Appendix B). The ERA evaluated potential impacts to ecological receptors resulting from exposure to site-related contaminants in surface and subsurface soils, sediment, surface water, and pore water. The results were used to identify areas and media posing elevated risks and to assist in the development and evaluation of remedial alternatives to mitigate potential impacts. The ERA was completed in substantial conformance with the ODEQ "Guidance for Ecological Risk Assessment" (1998 and 2001), and the OAR 340-122-084. The ERA report in Appendix B includes:

- List of COIs based on data collected during the SI;
- Description of the site ecology and ecological receptors (including threatened, endangered, and sensitive species) potentially occurring in the vicinity of the site;
- Conceptual site exposure model;

- List of the assessment and measurement endpoints;
- Description of the methodologies used in the ecological risk-based screening;
- Description of the uncertainties involved in the ERA; and
- Risk characterization summarizing the primary contaminants posing risk to ecological receptors.

3.2.1 Ecological Risk Assessment Summary

Table 7 presents an overall summary of the identified primary contaminants of potential ecological concern (CPECs) for ecological receptors in each media, and Table 8 summarizes the site human health and ecological COPCs for each media.

3.2.1.1 Soil and Waste Rock Piles

Plants were the most susceptible ecological group to metal concentrations in the soil and waste rock piles (11 CPECs identified). The primary CPECs for the soil-plant combination are arsenic, chromium (total), iron, mercury, selenium, silver, vanadium, and zinc because they exhibit elevated concentrations across the entire site or have the potential to bioaccumulate. Similarly, the primary CPECs for terrestrial invertebrates are arsenic, chromium, iron, manganese, mercury, selenium, silver, and zinc. The primary CPECs posing a risk to birds and mammals from exposure to the soil include arsenic, silver, selenium, mercury, and zinc. Arsenic concentrations were elevated at sample locations across the site and the risk ratios were extremely high. Mercury was present in elevated concentrations at a few locations (WP-4, and mill area); however, it has the potential to bioaccumulate. Mercury was retained as a CPEC because of the lack of site-specific bioaccumulation data.

Arsenic is the primary CPEC posing the most significant site-wide risk to plants, invertebrates, birds, and mammals. While individual receptors may be at risk from metal exposure at various locations throughout the site, their populations are unlikely to be significantly impacted in the vicinity of the mine because it is unlikely that populations of receptors reside strictly within the bounds of the site. Contaminated areas on the site offer lower habitat quality compared to the adjoining habitat. Thus, it is unlikely that a receptor would regularly utilize habitat within the contaminated areas. Because significant risks are not predicted for populations of terrestrial receptors, use of the soil ecological screening level values as the PRGs may not be appropriate.

3.2.1.2 Surface Water and Pore Water

Risk posed to wildlife and avian receptors from exposure to contaminated surface water is not elevated (risk ratios less than the Q-factor). There were very few CPECs identified for aquatic life receptors as a result of high risk ratios, including aluminum, barium, iron, and manganese. Risks to aquatic life from these CPECs were present only in the adit discharges. Additional CPECs identified because of their potential to bioaccumulate include mercury, selenium, silver, and zinc. Because of the lack of site-specific bioaccumulation data, risks from these CPECs could not be evaluated. These results illustrate that the Ajax and Magnolia Mines do not appear to be causing elevated risks to ecologic receptors exposed to surface water in Lucas Gulch.

No CPECs were identified for pore water based on elevated risk ratios. Mercury and zinc were identified as CPECs based on their bioaccumulative potential and detection in the pore water. Although not detected

in the pore water, silver was retained as a CPEC because the detection limit was higher than the screening level value (SLV).

3.2.1.3 Sediment

Thirteen sediment CPECs (antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc) were identified as posing a risk to aquatic receptors because of either direct exposure or bioaccumulation. Of these CPECs, antimony, chromium, copper, lead, manganese, and thallium presented risk to ecological receptors in only the settling ponds. Overall, the presence of elevated metal concentrations in the sediment of Lucas Gulch indicates there is some risk to aquatic macroinvertebrates.

4.0 SITE CLEANUP CRITERIA

Potential cleanup criteria may be based on ARARs or on risk assessments. The two categories are discussed in detail below. Proposed cleanup criteria are presented in Table 9.

4.1 Applicable or Relevant and Appropriate Requirements

Section 121(d) of the CERCLA, 42 U.S.C.§9621(d), the NCP, 40 CFR Part 300 (1990), and guidance and policy issued by the EPA, require that removal actions conducted under CERCLA comply with substantive provisions of applicable or relevant and appropriate standards, criteria, or limitations (i.e., ARARs) from federal and state environmental laws and state facility siting laws during and at the completion of the removal action. These requirements are threshold standards that any selected alternative must meet, unless an ARAR waiver is invoked.

ARARs are either "applicable" or "relevant and appropriate." Both types of requirements are mandatory under CERCLA and the NCP. This section discusses ARARs for the removal action activities to be conducted for the USFS at the project site. The ARARs identification is a component of the "non-time-critical removal process", which the USFS follows for these types of projects. As part of the EE/CA, these ARARs have been used to determine the design specifications and performance standards for the project. They are grouped as federal or State of Oregon ARARs. They are identified by a statutory or regulatory citation, followed by a brief explanation of the ARAR, and whether the ARAR is applicable, or relevant and appropriate. Administrative requirements are not ARARs and thus do not apply to actions conducted entirely on-site. Administrative requirements are those that involve consultation, issuance of permits, documentation, reporting, record keeping, and enforcement. The CERCLA program has its own set of administrative procedures, which assure proper implementation of CERCLA. The preamble to the final NCP states that the application of additional or conflicting administrative requirements could result in delay or confusion. Provisions of statutes or regulations that contain general goals that merely express legislative intent about desired outcomes or conditions, but are non-binding, are not ARARs. In accordance with Section 121(e) of CERCLA, no permits are required for the removal action.

A list of ARARs submitted and evaluated for the Ajax-Magnolia site is presented in Appendix C.

4.2 ARAR–Based Cleanup Criteria

The proposed site cleanup criteria for surface water (Table 9) are based on state or federal standards for the protection of aquatic life or human health, or on drinking water MCLs. Surface water at the Ajax-Magnolia site does not exceed any of ODEQ's water quality criteria for the protection of aquatic life (OAR 340-041-001). The stream is not a primary source of drinking water, but assigned beneficial uses include domestic water supply (OAR 340-41-071). No cleanup criteria were established for groundwater because there are no sources or uses of groundwater at the site.

ARAR-based cleanup criteria for sediments at the site were selected from Oak Ridge National Laboratory (ORNL) sediment PRGs and are summarized in Table 9. Arsenic concentrations exceeded the ORNL PRG at all locations except for the background location. At several locations, concentrations of copper, mercury, nickel and silver also exceeded the ORNL PRGs. Cadmium and lead concentrations both exceeded ORNL PRGs at two different locations.

"Soils" (waste rock) at the site were compared with EPA Region 9 PRGs for industrial soil in the COPC screening process. However, cleanup criteria selected for soils are risk based because site-specific human health and ecological risk assessments were completed.

4.3 Risk–Based Cleanup Criteria

Risk-based site cleanup criteria from established generic values, such as the BLM RMCs, can be used or site-specific values can be developed from the human health risk calculations. Because of the unique nature of the site and high background arsenic levels in soil, a risk-based cleanup criterion for arsenic is proposed. A soil cleanup level of 152 mg/kg was back calculated based on the Oregon soil cleanup standard of a total ECR<1.E-05 and the most sensitive human receptor at the site (adult worker). Because arsenic is prolific at the site and is the primary risk driver, soil cleanup levels were not established for the other COPCs.

Based on the soil sample results, arsenic concentrations in four waste piles (two piles at Magnolia Mine: WP-9, 10; and two piles at Ajax Mine: WP-12, and 13) and one area downhill of waste pile WP-1 at Magnolia Mine are below the risk-based soil cleanup criterion. Also, the maximum lead concentration in these piles is 22 mg/kg, which is well below the EPA screening level of 400 mg/kg. Therefore, these four waste piles and the area downhill from waste pile WP-1 do not require removal or remedial action.

5.0 IDENTIFICATION OF REMOVAL ACTION OBJECTIVES

The removal action objectives (RAOs) at the Ajax and Magnolia Mines are to:

- Improve public safety by closing existing mine workings;
- Improve waters of Lucas Gulch and associated tributaries by decreasing metals loading to the creek; and
- Reduce undesirable human and wildlife surface exposure to metals in the waste rock piles.

The processes that mobilize contaminants in the waste rock piles include:

- Winds mobilizing metals–laden dust;
- Overland flow (runoff) and sediment transport during precipitation and snowmelt events; and

- Percolation and potential leaching of metals into groundwater, and thence into the stream.

Human and wildlife exposure pathways that have been identified include: dermal contact with contaminated materials, inhalation of airborne materials and ingestion of contaminated soil and water. Human exposure appears limited to infrequent and intermittent site visits by recreational users (hunters or hikers). Control of the environmental, human, and wildlife exposure pathways from mine waters and waste rock deposits is the focus of this EE/CA.

6.0 ANALYSIS OF REMOVAL ACTION ALTERNATIVES

This section describes the selection of a removal action using a four–step process:

- Identify technologies and processes potentially applicable to the site;
- Screen technologies and processes to eliminate ineffective or unfeasible technologies;
- Develop removal action alternatives using combinations of technologies that pass the screening process; and
- Evaluate the alternatives according to criteria described in Section 6.3.

6.1 Identification and Screening of Removal Action Technologies

Removal action technologies were evaluated only for contaminated media. These include:

- Waste rock piles
- Magnolia and Ajax adit discharge
- Physical hazards, such as open adits and stopes, collapsed shafts, equipment, and structures
- Settling pond sediments
- Stream sediments disrupted by waste rock removal in the riparian zone

Sediment dredging from the stream would be costly and require extensive restoration of the stream channel and riparian zones after dredging, further increasing the cost. The nature of the risk presented by the sediments does not appear to warrant such drastic measures at this time, except in areas were waste materials are to be removed from the riparian zones during waste rock removal and wetlands construction. If further water quality monitoring indicates that a significant risk from sediment remains, dredging of the stream could be revisited at a later time.

6.1.1 Identification of Removal Action Technologies

Appropriate removal action technologies have been identified based on a review of technical literature and previous experience at similar sites. These technologies vary in their ability to achieve the RAOs. The identified technologies are described in Table 10.

6.1.2 Removal Action Technology Screening

Removal action technologies were screened to eliminate inappropriate, ineffective, infeasible or cost prohibitive methods. In addition, technologies with unproven or uncertain performance were eliminated if

they have relatively high implementation costs and/or would likely require implementation with other costly mitigation components. Technologies with uncertain or unproven performance were retained if they represented potentially cost effective mitigation and the performance can be investigated through pilot or bench scale testing. For this EE/CA, a potentially cost effective technology is one that could provide protection comparable to other standard methods utilized in mine reclamation, at a cost similar to or less than the costs of those methods. All components not screened out were retained as potential technologies that could be implemented at the project site.

The technologies were assessed relative to others in the same sub-category based on effectiveness, implementability, and cost. This allowed each technology to be assigned a relative ranking of high, medium, or low for each evaluation criterion. Table 10 summarizes the results of the removal action technology screening process, including the technologies retained for incorporation into removal action alternatives.

6.2 Removal Action Alternatives For Evaluation

Conceptual removal alternative designs were developed for both sites (Ajax and Magnolia) from the technologies that passed the screening process. Key design features are estimates only and provided for comparison purposes. The material quantities and flow rates provided in this section are estimates only and should be more accurately quantified for final design and construction. The referenced figures are conceptual only and not intended for construction.

The alternatives include:

- **ALTERNATIVE 1 – No Action**
- **ALTERNATIVE 2 – Excavation and Off-site Disposal**
- **ALTERNATIVE 3 – Excavation and On-site Disposal**
- **ALTERNATIVE 4 – Adit Discharge Treatment**

ALTERNATIVE 1 – No Action

- Waste rock would remain in its current location
- Site safety issues (i.e. collapsed shafts, unsafe adits, etc.) would remain as is
- Adit discharge would remain untreated

The following common elements are considered part of Alternatives 2 and 3.

- **Bate Gates**. Bat gates, shown in Figure 10, will be installed on the three open adits at the site (two at Magnolia and one at Ajax). The existing wooden structures around the portals will be removed to the extent possible. The use of the gates would prevent access while providing potential bat habitat within the adits.

- **Cabin and Debris Removal**. The USFS archaeologist responsible for this site should be consulted to evaluate the historical and cultural significance of the existing cabin, collapsed cabin, mill remnants, and other features at the site (Figure 2). If deemed to have no historical significance, the cabin and other remnants would be demolished. The debris would be segregated according to size. Pieces that are 6 inches across or larger would be placed on top of backfilled and reseeded areas to minimize erosion. Smaller materials and the remains of the mill would be

buried in the adits/shafts to be backfilled. Untreated small timbers could potentially be burned on site, if current fire conditions allow.

- **Backfilling Collapsed Vertical Shafts**
  - **Ajax**
    - Location by WP-13 (Figure 2)
      - With excavator, excavate ~370 cubic yards (cy) of material out of the shaft up to 20 feet below grade to determine whether there is any bridging of material in the shaft and to determine if subsequent floor is solid.
      - Cut timbers and miscellaneous metal associated with the shaft into appropriate lengths and bury within the shaft.
      - Push in ~80 cy of waste rock material from WP-13 and backfill with excavated material (~370 cy) at a rate to ensure bridging does not occur.
      - Grade to blend with surrounding contours and promote positive drainage.
      - Compact backfill, cover with 6 inches of topsoil (~20 cy), fertilize, seed, and mulch.

  - **Magnolia**
    - Location by WP-1 (Figure 2)
      - With excavator, excavate ~370 cy material out of the shaft up to 20 feet below grade to determine whether there is any bridging of material in the shaft and to determine if subsequent floor is solid.
      - Since this area has a cut into the hillside, which includes a collapsed adit, push in ~80 cy of waste rock from WP-1 and backfill with excavated material (~370 cy) at a rate to ensure bridging does not occur in the shaft.
      - Grade to blend with surrounding contours and promote positive drainage.
      - Compact backfill, cover with 6 inches of topsoil (~20 cy), fertilize, seed, and mulch.
      - Since this area does not have water discharging from the adit and it is significantly higher in elevation from the floodplain (~70 feet), water is not an issue.

- **Backfilling Collapsed Adits**
  - **Ajax**
    - Two upper collapsed adits near WP-12 and WP-14 (Figure 3)
      - No action because the highwalls are comparable to rugged terrain found throughout USFS administered lands.
    - Lower collapsed adit near WP-13 (Figure 3)
      - No action because the collapsed adit is not easily discernable from the surrounding hillside and does not present a physical hazard.

  - **Magnolia**
    - Lower collapsed adit near WP-9 (Figure 4)
      - No action because the collapsed adit is not easily discernable from the surrounding hillside and does not present a physical hazard.
    - Upper collapsed adit near WP-7 (Figure 4)
      - Construct temporary road (~1,275 feet) from the existing road near the cabin to WP-7 on the old road bed (Figure 6). Road is in generally good condition but will require considerable tree felling. Felled trees and brush will be stockpiled and used to generate mulch for covering newly seeded areas.
      - Excavate ~400 cy of material along the area of the collapsed adit, down to the adit or a firm foundation, to the physical hazard (approximately 150 lineal feet).

- Push in approximately 170 cy of waste rock from WP-7 and backfill with the excavated material (~400 cy).
- Grade to blend with the surrounding contours and promote positive drainage.
- Compact backfill and cover with 6 inches of topsoil (~60 cy), fertilize, seed, and mulch.

▪ Upper collapsed adit near WP-1 (Figure 4)
- Addressed during backfilling of the adjacent collapsed vertical shaft (see above).

▪ Subsidence above entrance to Main Adit (Figure 4)
- There are numerous methods that can be used to prevent further subsidence above the adit, approximately 50 feet inside the portal. However, since there are numerous subsidences along this adit, it is not considered worthwhile to correct these deficiencies at this time. A 6-inch diameter HDPE pipe should be installed in the adit behind the bat gate to collect adit discharge and allow for continual drainage, even if the adit should collapse.

ALTERNATIVE 2 – Excavation and Off-site Disposal

- Risk-based cleanup level for soil and waste rock is 152 mg/kg for arsenic.
- Excavate waste rock and soil exceeding the cleanup level and transport to a commercial Treatment, Storage, and Disposal Facility (TSDF), such as the one at Arlington, Oregon (215 miles from the site) or at Grand View, Idaho (225 miles from the site).
- Use a Niton XRF to assist in delineating the extent of excavation and to field check removal efforts. Collect a minimum of one composite confirmation sample from each waste rock area for verification of waste removal.
- Grade areas from which the waste rock was excavated to blend with the surrounding topography and promote drainage. Cover areas with 6 inches of topsoil (~380 cy), fertilize, seed, and mulch.
- Specifics to each site are as follows:
  - **Ajax**
    - Excavate ~1,200 cy of waste material from WP-11 using an excavator.
    - Excavate ~50 cy of impacted soils from the stream adjacent to WP-11 using an excavator.
    - Reconstruct ~250 feet of stream channel where WP-11 is removed. Following removal of the waste material, a defined channel will be excavated to the approximate configuration shown on Figure 9, and filled with ~250 cy of streambed material. The stream banks will be reconstructed using coir logs and fabric encapsulated topsoil (~250 cy). The reconstructed banks will be seeded before encapsulation and willow stakings will be planted in the reconstructed banks. Willow root wads also will be installed to provide bank stabilization and aquatic habitat.
    - See Alternative 4 for treatment of adit discharge.

  - **Magnolia**
    - Excavate ~3,050 cy of waste material from WP-1, -2, -3, -4, -5, -6, -7, -8, the mill area, and settling ponds using an excavator. This volume does not include the waste material from WP-1 and WP-7 to be used for backfilling the adjacent collapsed adits and shaft.
    - See Alternative 4 for treatment of adit discharge.

ALTERNATIVE 3 – Excavation and On-site Disposal

- Risk-based cleanup level for soil and waste rock is 152 mg/kg for arsenic.
- Excavate soil and waste rock exceeding the cleanup level and transport to an on-site repository. Use a Niton XRF to assist in delineating the extent of excavation and to field check removal

efforts. Collect a minimum of one composite confirmation sample from each waste rock area for verification of waste removal.

- The proposed repository site is on the Magnolia property, immediately north of the cabin (Figure 6), and covers approximately 0.6 acres. The site will require considerable tree felling but appears to be a suitable location and is above the Lucas Gulch flood plain. The site will be cleared and grubbed and ~3,500 to ~4,000 cy of topsoil (depending on selected repository cover option) will be excavated from the repository footprint and stockpiled for use in the repository cover and to cover the excavated waste areas and other disturbances. The repository configuration shown in Figure 6 has an available storage capacity of ~4,900 cy.
- Place and compact waste rock in the repository in 6-inch lifts to the approximate configuration shown in Figures 6 and 9. The maximum slope will be 3H:1V and the top surface should be slightly sloped away from the crest to minimize erosion, promote drainage, and prevent ponding on the repository surface.
- Results of surface water data in the SI suggest that metal leaching from the existing waste piles is not impacting the stream. Therefore, a geosynthetic cover to prevent percolation through the waste material may not be necessary. However, obtaining additional leaching data is suggested before selecting a final cover configuration.
- Two cover alternatives were evaluated for the repository:

  - **Repository Cover Option 1**
    - Engineered cover consisting of a geosynthetic membrane sandwiched between a 12-inch screened bedding layer and a 6-inch drainage layer, overlain by 2 feet of soil (Figure 9).
    - Approximately 1,000 cy of fine bedding material would be generated on-site by selectively screening the waste rock material (70 percent passed a #4 screen). The material would be placed and compacted in one 12-inch lift.
    - Approximately 4,620 square yards (sy) of geosynthetic membrane would be required, including ~20 percent overage. The liner would be installed and tested per the manufacturer's specifications.
    - Approximately 500 cy of coarse (<3/4-inch) drainage material would be generated on-site by selectively screening the topsoil material. The material would be carefully placed over the liner in one loose 6-inch lift.
    - Approximately 4,620 sy of filter fabric would be installed between the drainage layer and cover soil to prevent piping of fines into the coarse material.
    - The 24-inch soil cover would be composed of ~2,570 cy of topsoil stockpiled during excavation of the repository. The soil would be placed in one lightly compacted 12-inch lift and one loose 12-inch lift. Soil amendments would be added and the cover would be seeded and mulched.

  - **Repository Cover Option 2**
    - Conventional cover consisting of a 6-inch capillary break of coarse material, overlain by 2 feet of soil (Figure 9).
    - Approximately 500 cy of coarse material for the capillary break would be generated on-site by selectively screening the waste rock material. The material would be place in one loose 6-inch lift.
    - Approximately 4,620 sy of filter fabric would be installed between the capillary break layer and cover soil to prevent piping of fines into the coarse material.
    - The 24-inch soil cover would be composed of ~2,570 cy of topsoil stockpiled during excavation of the repository. The soil would be place in one compacted 12-inch lift, and one loose 12-inch lift. Soil amendments would be added and the cover would be seeded and mulched.

- Excavate a diversion channel along the up gradient edge of the repository to intercept surface water run-on (Figures 6 and 9). The earth-lined, v-shaped channel would be ~410-feet long, 1 to 2 feet deep, with 2H:1V side slopes. The channel should have a slope of 1 to 2 percent and be self-cleaning (i.e., sufficient flow velocity to prevent plugging without requiring riprap erosion protection). Approximately 4 cy of riprap protection would be installed at the channel outlet to prevent erosion. Presumably, the riprap would be obtained from the town of Granite, with a round trip haul distance of approximately 10 miles.
- Place wood debris generated from the tree felling over the final repository cover surface to prevent erosion.
- Grade areas from which the waste rock was excavated to blend with the surrounding topography and promote drainage. Cover areas with 6 inches of topsoil (~380 cy), fertilize, seed, and mulch.
- Specifics to each site are as follows:
  - **Ajax**
    - Excavate ~1,200 cy of waste material from WP-11 using an excavator.
    - Excavate ~50 cy of impacted soils from the stream adjacent to WP-11 using an excavator.
    - Reconstruct ~250 feet of stream channel where WP-11 is removed. Following removal of the waste material, a defined channel will be excavated to the approximate configuration shown on Figure 9, and filled with ~250 cy of streambed material. The stream banks will be reconstructed using coir logs and fabric encapsulated topsoil (~250 cy). The reconstructed banks will be seeded before encapsulation and willow stakings will be planted in the reconstructed banks. Willow root wads also will be installed to provide bank stabilization and aquatic habitat. The disturbed riparian areas adjacent to the reconstructed channel will be covered with 6 inches of topsoil (~185 cy), fertilized, and seeded
    - See Alternative 4 for treatment of adit discharge.

  - **Magnolia**
    - Excavate ~3,050 cy of waste material from WP-1, -2, -3, -4, -5, -6, -7, -8, mill area, and settling ponds using an excavator. This volume does not include the waste material from WP-1 and WP-7 to be used for backfilling the adjacent collapsed adits and shaft.
    - See Alternative 4 for treatment of adit discharge.

ALTERNATIVE 4 – Adit Discharge Treatment

- Proposed site cleanup criteria for water are summarized in Table 9.
- Water discharging from the open adit across Lucas Gulch at the Magnolia site currently meets the cleanup criteria. Therefore, the proposed treatment alternatives focus on the two main open adits at Magnolia and Ajax.
- The proposed alternative for treating the adit discharge consists of a two-phased approach. The first phase involves constructing sediment ponds to collect sediment and oxyhydroxide precipitates that form when the adit discharge contacts the outside air. This step should reduce metals concentrations and significantly improve the overall water quality. Effluent from the sediment ponds would be monitored to assess water quality improvement. If monitoring data indicates that the effluent remains above cleanup criteria, the second phase consisting of aerobic wetlands would be constructed. The aerobic wetlands would be composed of a mixture of organic material and gravel, placed over an impervious synthetic liner. Such a wetland should significantly remove iron, arsenic, and manganese by oxidation and precipitation. Both features would require periodic maintenance and sludge removal.

- Conceptual sediment ponds were designed to provide 24-hour retention time with allowance for freeboard (Figures 7 and 8).
- Conceptual aerobic wetlands were designed based on a loading factor of 200 square feet per gallon per minute (sf/gpm) (Colorado Division of Minerals and Geology [CDMG] 2002).
- Specifics to each site are as follows:
  - **Ajax**
    - Estimated peak flow rate ~5gpm.
    - Sediment pond and aerobic wetlands would be constructed adjacent to Lucas Gulch within the footprint of WP-11 (Figures 7 and 9). Depending on the depth of excavation, fill material may be required to provide a bench for constructing the pond and wetlands above the Lucas Gulch stream channel. The pond and wetland bottoms should be constructed a minimum of 4 feet above the bottom of Lucas Gulch. For the conceptual design, it was assumed that additional fill will not be required.
    - The 720-square foot (sf) sediment pond will be 3-feet deep with 2H:1V side slopes and a storage capacity of ~10,230 gallons (gal). The pond will be lined with 45-mil HDPE. Construction of the pond will require excavation of ~25 cy of soil. The excavation will consist of a balanced cut-and-fill, i.e., the excavated material will be compacted and used for the perimeter berm.
    - The 1,000-sf aerobic wetland will be 2-feet deep with vertical sides. The wetland will be lined with 45-mil HDPE and filled with ~74 cy of organic material mixed with gravel and varying in depth from 8 to 24 inches. Construction of the wetlands will require excavation of ~37 cy of soil. The excavation will consist of a balanced cut-and-fill, i.e., the excavated material will be compacted and used for the perimeter berm.
    - The excavated areas will be lightly compacted and prepared for installation of the HDPE liners. Cobble and rocks > ¾-inch will be removed from the prepared surface and a 6-inch sand bedding layer (~50 cy) will be placed under the liner to prevent puncturing. The HDPE liners will be installed, tested, and anchored per the manufacturer's specifications.
    - Riprap erosion protection (~15 cy) will be selectively placed along the outer berm on the upstream side and in areas subject to potential erosion from Lucas Gulch flows.
    - An 8-inch HDPE culvert will be installed to convey the adit discharge from the adit to the sediment pond (~30 feet).
    - Excavate a diversion channel along the up gradient edge of the road to intercept surface water run-on (Figures 7 and 9). The earth-lined, v-shaped channel would be ~140-feet long, 1 to 2 feet deep, with 2H:1V side slopes. Riprap protection (~4 cy) would be installed at the channel outlet to prevent erosion. Construction of the wetlands would require extending the channel ~44 feet.
    - Excavate a discharge channel from the sediment pond to Lucas Gulch (Figure 7). The earth-lined, v-shaped channel would be ~30-feet long, 1-foot deep, with 2H:1V side slopes. Riprap protection (~4 cy) would be installed at the channel outlet to prevent erosion. Construction of the wetlands would require relocating and lengthening (+30 feet) the discharge channel.
    - Removal of waste material and reconstruction of stream channel is discussed under Alternatives 2 and 3.

  - **Magnolia**
    - Estimated peak flow rate ~20 gpm.
    - Sediment pond and aerobic wetlands would be constructed at the mouth of the main adit and in the area of the existing ponds (Figures 8 and 9).

- Sediment pond will be shaped to fit the existing area with minimal regarding. The 1,900-sf pond will be 3-feet deep with 2H:1V side slopes and a storage capacity of ~40,500 gal. The pond will be lined with 45-mil HDPE. Construction of the pond will require excavation of ~100 cy of soil. The excavation will consist of a balanced cut-and-fill, i.e., the excavated material will be compacted and used for the perimeter berm.
- The 4,000-sf aerobic wetland will be 2-feet deep with vertical sides. The wetland will be lined with 45-mil HDPE and filled with ~296 cy of organic material mixed with gravel and varying in depth from 8 to 24 inches. Construction of the wetlands will require excavation of ~150 cy of soil. The excavation will consist of a balanced cut-and-fill, i.e., the excavated material will be compacted and used for the perimeter berm.
- The excavated areas will be lightly compacted and prepared for installation of the HDPE liners. Cobble and rocks > ¾-inch will be removed from the prepared surface and a 6-inch sand bedding layer (~125 cy) will be placed under the liner to prevent puncturing. The HDPE liners will be installed, tested, and anchored per the manufacturer's specifications.
- Riprap erosion protection (~15 cy) will be selectively placed along the outer berm in areas subject to potential erosion from Lucas Gulch flows.
- A 12-inch HDPE culvert will be installed to convey the adit discharge from the adit to the sediment pond (~14 feet). Construction of the wetland would require a second 12-inch HDPE culvert from the sediment pond to the wetland (~34 feet).
- Excavate two diversion channels up gradient edge of the pond to intercept surface water run-on (Figures 8 and 9). The earth-lined, v-shaped channels would be ~450-feet long (total), 1 to 2 feet deep, with 2H:1V side slopes. Riprap protection (~4 cy) would be installed at each channel outlet to prevent erosion. Construction of the wetlands would require extending one channel ~40 feet.
- Excavate a discharge channel from the sediment pond to Lucas Gulch (Figure 8). The earth-lined, v-shaped channel would be ~100-feet long, 1-foot deep, with 2H:1V side slopes. Riprap protection (~4 cy) would be installed at the channel outlet to prevent erosion. Construction of the wetlands would require relocating the discharge channel but the length would remain approximately the same.
- Removal of waste material and reconstruction of stream channel is discussed under Alternatives 2 and 3.

6.3 Evaluation of Removal Action Alternatives

The removal action alternatives were evaluated based on the following criteria:

- Effectiveness
- Ease of implementation
- Relative cost

Effectiveness is defined as the ability of an alternative (relative to other options in the same technology sub-category) to:

- Achieve RAOs – pertains to the ability of an alternative to achieve, at least to some degree, the project RAOs;
- Protect human health and the environment – addresses whether or not the remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls, or institutional controls;

- Comply with ARARs – addresses whether or not a remedy will meet all ARARs of other Federal and State environmental statutes and/or provide grounds for invoking a waiver;
- Provide long-term effectiveness and permanence – refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals have been met;
- Reduce toxicity, mobility, or volume through treatment – refers to the anticipated performance of the treatment technologies; and
- Provide short-term effectiveness – qualitatively addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period until cleanup goals are achieved.

Ease of implementation encompasses both the technical and administrative feasibility of implementing a response alternative. It also takes into account legal considerations. Factors of particular consideration include construction and operational feasibility; availability of equipment, personnel, and treatment capacity; community acceptance; and the ability to obtain necessary permits for off-site actions.

The relative costs of each alternative are evaluated based on professional experience, engineering judgment, and standard cost estimating tools. Primary cost considerations include (1) capital costs, (2) engineering and design costs, and (3) operation and maintenance (O&M) costs.

The alternative evaluation is summarized in Table 11.

6.4 Cost Analysis

The estimated costs for each task are summarized in Table 11 and detailed costs for the various alternatives are presented in Appendix D. Costs are based on experience at similar sites, on published data and reports, and on inquiries to possible vendors. Many construction unit costs were obtained from R.S. Means (2004) data for the Pendleton, Oregon area, assuming union wage rates and including overhead and profit. Estimated costs are based on conceptual design only and are not suitable for construction. The estimated costs are intended for alternative comparison only.

Assumptions made in preparing the cost estimate include:

- All removal actions can be completed in one field season using standard construction equipment. Because the wetlands are considered optional, a separate field season was included in the estimated costs for wetlands construction.

- A temporary portable bridge will be required on Granite Creek for site access for all action alternatives. However, the cost of the sediment pond construction assumes the bridge will already be in place and does not include costs for the bridge.

- All borrow soil for covering the repository and excavated waste areas will be available on site within the repository footprint. The borrow soil will be screened on-site to provide the fine and coarse materials needed in the repository cover and for the liner bedding layer for the sediment ponds.

- All trees and brush felled during the removal action will be placed over the seeded areas to minimize erosion, or burned on site.

- Maintenance and monitoring costs based on a 3-year period following completion of removal action. Costs for maintenance activities spanning more than 3 years, such as periodic removal of the sediment pond sludge, were prorated based on the anticipated maintenance interval.

- Fees based on construction costs included 20 percent for design, and 10 percent for construction management, plus a 20 percent contingency on total project costs.

- Present value corrections were not calculated because of the short duration of the removal action and monitoring.

It should be noted that the conceptual design of the on–site repository at Magnolia assumes that it will receive waste from both the Ajax and Magnolia Mines. For the decision to be independent for the two mines, repository construction costs were allocated to each mine in proportion to its fraction of the total waste volume, *plus 10 percent,* to reflect the loss of economies of scale if waste rock from one of the mines is not placed in the repository. Therefore, the total cost of concurrent removal actions at both mines would be significantly less than the sum of the individual costs for each mine.

6.5 Identification of Data Gaps

Additional data that could clarify key issues and assist in preparation of a final design include:

- Leaching data for waste rock
- Adit and stream flow measurements during seasonal high water conditions

7.0 COMPARATIVE ANALYSIS OF REMOVAL ACTION ALTERNATIVES

The retained alternatives were compared based on the following nine criteria:

- Overall protectiveness of public health, safety, and welfare
- Environmental protectiveness
- Compliance with ARARs
- Long-term effectiveness and permanence
- Reduction in toxicity, mobility, and volume
- Short-term effectiveness
- Implementability
- State and Federal agency and community acceptance
- Cost

The comparative analysis of removal action alternatives is summarized in Table 11.

8.0 RECOMMENDED REMOVAL ACTION ALTERNATIVE

Key features of the preferred removal action alternative are discussed below. Details are provided in Section 6.2 and on Figures 5–10. The preference expressed here is based on the analysis discussed in Sections 6.3 and 7.0, and summarized in Table 11.

At both Ajax and Magnolia Mines, the preferred alternative is a combination of:

- **Alternative 3 – Excavation and On-site Disposal; and**
- **Alternative 4 – Adit Discharge Treatment.**

Mine waste and soil exceeding the arsenic site cleanup level (152 mg/kg) would be excavated and disposed of in an on-site repository. Physical hazards would be addressed by installing bat gates in open adits and backfilling collapsed shafts and adits with surrounding waste rock and soil. The backfilled areas and excavated waste areas would be covered with topsoil, seeded, and mulched. The cabins (one standing and one collapsed) would be demolished and all woody debris would be buried on-site in the repository and collapsed shafts, or burned on site. Sediment ponds would be constructed to treat the adit discharge from the main open adit at each site. Effluent from the sediment ponds would be monitored to assess water quality. If metal concentrations continue to exceed cleanup levels, aerobic wetlands will be constructed adjacent to the sediment ponds to provide additional treatment.

The preferred alternative would dispose of a total of ~4,630 cy of waste rock and treat up to 36,000 gallons of adit discharge per day. The estimated removal action cost is $217,933 for Ajax, and $402,035 for Magnolia. Combining construction activities for both sites would significantly reduce overall because of shared resources and economies of scale. Potential future construction of aerobic wetlands would be $58,146 for Ajax and $75,888 for Magnolia.

DISCLAIMER

This abandoned mine/mill site was created under the General Mining Law of 1872 and is located solely on National Forest System (NFS) lands administered by the USFS. The USFS has conducted a PRP search relating to this site and has been unable to identify any current claimants or viable PRPs at this time. The United States has taken the position and courts have held that the United States is not liable as an "owner" under CERCLA Section 107 for mine contamination left behind on NFS lands by miners operating under the 1872 Mining Law. Therefore, USFS believes that this site should not be considered a "federal facility" within the meaning of CERCLA Section 120 and should not be listed on the Federal Agency Hazardous Waste Compliance Docket. Instead, this site should be included on EPA's CERCLIS database. Consistent with the June 24, 2003 OECA/FFEO "Policy on Listing Mixed Ownership Mine or Mill Sites Created as a Result of the General Mining Law of 1872 on the Federal Agency Hazardous Waste Compliance Docket," we respectfully request that the EPA Regional Docket Coordinator consult with the USFS and EPA Headquarters before making a determination to include this site on the Federal Agency Hazardous Waste Compliance Docket.

The proposed removal action designs presented in this EE/CA are conceptual only and not intended for construction. All material quantities are estimates only and should be verified for final design.

Prepared by:

Millennium Science and Engineering, Inc.

Michael L. May
Principal Author

Millennium Science and Engineering, Inc.

Michael J. Puett, P.E.
Technical Reviewer

REGISTERED PROFESSIONAL ENGINEER
76069
OREGON
MAR. 8, 2005
MICHAEL J. PUETT

EXPIRATION DATE: 12/31/06

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Tables

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Table 1. Monthly Climatic Averages for Granite 4 WSW

Parameter	Month												Annual
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Average Maximum Temperature (°F)	30.3	36.4	40.1	49.0	58.0	66.2	77.5	76.2	68.9	55.8	40.0	32.2	52.6
Average Minimum Temperature (°F)	11.3	15.1	17.0	25.3	31.4	36.6	39.3	38.4	33.8	28.8	21.5	15.6	26.2
Average Total Precipitation (in)	3.66	2.93	2.73	1.87	2.33	1.76	0.60	0.71	1.08	1.93	2.93	3.84	26.37
Average Total Snowfall (in)	40.6	31.5	29.7	10.5	3.9	0.6	0.0	0.0	0.7	3.7	17.5	35.4	174.1
Average Snow Depth (in)	28	35	35	16	1	0	0	0	0	0	3	14	11

Notes:
Source: National Weather Service, Period of Record 7/2/1948 to 10/16/1967
Percent of possible observations for period of record: maximum temperature = 99.3%, minimum temperature = 99.2%, snowfall = 99.1%, snow depth = 98.6%
°F = Degrees Fahrenheit
in = inches

Table 2. Analytical Results Summary for MSE Waste Rock Samples

Site	Sample Identification	Metal Concentration (mg/kg)																		
		Al	Sb	As	Ba	Be	Cd	Cr_{Tot}	Co	Cu	Fe	Pb	Mg	Mn	Hg	Ni	Se	Ag	Tl	V	Zn
Magnolia	WP-7 (0.5)	2,700	45.7	277	98.6	0.77	3.10	13.0	16.1	160.0	49900	1210	518	1070	2.2	32.9	2.0	57.7	0.6	60.4	509
	WP-9 (0.5)	6,880	3.6	376	98.8	0.25	0.025	14.3	8.6	68.0	42300	19.4	2480	833	1.7	27.4	0.9	4.0	0.7	51.8	102
	WP-10 (0.5)	1,340	78.5	132	32.8	0.015	0.025	26.1	0.8	13.6	7207	14.0	155	8.30	2.7	6.6	2.8	6.6	1.6	8.8	5.5
	WP-14 (0.5)	9,200	0.495	14.2	112	0.67	0.025	19.0	14.9	68.7	25600	6.7	3860	734	3.9	23.7	0.07	0.04	0.2	35.3	63.7
Ajax	WP-11 (0.5)	5,280	4.7	1750	82.4	0.77	0.025	17.7	44.6	117.0	10500	28	10500	4800	1.5	88.2	2.20	0.68	0.18	34.6	292
	WP-13 (0.5)	20,600	0.44	28.5	340	0.66	0.025	63.5	13.9	133.0	59000	22	7320	1290	0.1	27.3	3.20	0.035	0.5	176	105
Standards	EPA Industrial PRG[a]	100000	410	1.6	67000	1900	450	450	1900	41000	100000	750	NA	19000	310	20000	5100	5100	67	7200	100000
	EPA-Ecological SSLs[b]	NA	21	37	NA	NA	29	5	32	61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120
	EPA-Human Health SSLs[c]	NA	31	0.4	5500	0.1	78	270	NA	NA	NA	400	NA	NA	NA	1600	390	390	NA	550	23000
	ORNL[d]	NA	5	9.9	283	10	4	0.4	20	60	NA	40.5	NA	NA	0.00051	30	0.21	2	1	2	8.5
	ODEQ Ecological[e]	50	5	8	85	10	4	NA	20	50	NA	16	NA	100	0.1	30	1	2	1	2	50

Notes:
Highlighted cells indicate result below the method detection limit (MDL), result reported as ½ the MDL.
NA = not available
mg/kg = Milligram per kilogram
[a]U.S. Environmental Protection Agency (EPA) Region IV Industrial Soil Preliminary Remediation Goals (PRGs) , http://epa.gov/region09/waste/sfund/prg/index.htm.
[b]EPA Ecological Soil Screening Levels – Lowest Criteria Indicators for bird, plant, invertebrate, and mammal (EPA 2000a).
[c]EPA Generic Soil Screening Levels (SSLs) for Protection of Human Health (EPA 2000b).
[d]Oak Ridge National Laboratory (ORNL) PRGs for protection of plants, wildlife, or soil invertebrates (Efroymson et. al. 1997).
[e]Oregon Department of Environmental Quality (ODEQ) Guidance for Ecological Risk Assessment, Level II Screening Values – lowest criteria for bird, plant, invertebrate, and mammal (ODEQ 1998).

Table 3. Summary of Waste Rock Pile Volumes and Selected Metal Concentrations

Waste Pile	Location	Est. Vol. (cy)	Concentration (mg/kg)						
			Arsenic	Chromium	Iron	Lead	Manganese	Mercury	Vanadium
	Cleanup Level =		152						
	Magnolia Mine								
Mill	Area around old crusher/mill	**91**	**828**	5.0	24700	524	130	9.4	30.5
WP-1	At lower collapsed shaft/adit	**1255**	**1220**	10.8	75700	31.7	2350	1.8	63.1
WP-2	Near main adit	**113**	**376**[c]	14.3[c]	42300[c]	19.4[c]	833[c]	1.7[c]	51.8[c]
WP-3	Adjacent to main adit	**21**	**376**[c]	14.3[c]	42300[c]	19.4[c]	833[c]	1.7[c]	51.8[c]
WP-4	Adjacent to pond	**484**[a]	**3730**	22.0	139000	151	34300	9.0	34.2
WP-5	South pile along road	**72**	**286**	14.3	30100	18.9	631	3.2	27.6
WP-6	At mouth of adit	**22**	**376**[c]	14.3[c]	42300[c]	19.4[c]	833[c]	1.7[c]	51.8[c]
WP-7	At upper collapsed adit	**1030**	**277**	13.0	49900	1210	1070	2.2	60.4
WP-8	Stacked on road by main adit	**189**	**376**[c]	14.3[c]	42300[c]	19.4[c]	833[c]	1.7[c]	51.8[c]
WP-9	At lower collapsed adit	4	132	26.1	7207	14.0	8.3	2.7	8.8[b]
WP-10	Across Lucas Gulch	52	14.2	19.0	25600	6.7	734	3.9	35.3
	Ajax Mine								
WP-11	At main adit around pond Red soil	**1190** **46**	154 - **1750**	8 - 17.7	10500 - 37500	5 - 28	1700 - 4800	1.2 - 1.9	15.1 - 34.6
WP-12	At lower collapsed adit	1632	95.7	39.5	35500	9.7	762	0.43	65.8
WP-13	On hillside along road	357	28.5	63.5	59000	22	1290	0.1[b]	176
WP-14	At upper collapsed adit	199	ND	ND	ND	ND	ND	ND	ND
	Est. Waste to Leave =	2,244							
	Est. Waste to Remove =	**4,513**							

Notes: Data in this table represent samples collected by MSE and samples collected during the SI.
Concentrations in **bold red** exceed the proposed cleanup level
Volumes in **bold** represent waste rock volumes to be removed
ND = No data; concentrations are assumed to be similar to WP–12
[a] Volume includes 141 cy of sludge from the settling ponds.
[b] Analytical result reported below the practical quantitation limit but above the method detection limit.
[c] Analytical results represent a composite sample collected from waste piles 2, 3, 6, and 8.
cy = Cubic yard
mg/kg = Milligram per kilogram

Table 4. Human Health Contaminant of Potential Concern Summary

Contaminant of Potential Concern	Media			
	Soil	Surface Water	Sediment	Multimedia
Arsenic	X	X	X	X
Lead	X	X		X
Manganese	X	X	X	X

Table 5. Human Health Exposure Human Health Exposure Point Concentration Summary

Analyte	Exposure Point Concentrations					
	RME			CTE		
	Soil (mg/kg)	Surface Water (µg/L)	Sediment (mg/kg)	Soil (mg/kg)	Surface Water (µg/L)	Sediment (mg/kg)
Arsenic	2520	239	2800	643	44	987
Lead	1,210	1.70	69	390	1.01	35.4
Manganese	19,300	1,740	40,600	3,436	386	7,748

Notes:
CTE = Central tendency
RME = Reasonable maximum exposure
mg/kg = Milligram per kilogram
µg/L = Microgram per liter

Table 6. Human Health Hazard and Cancer Risk Summary

Receptor	Media			TOTAL	Acceptable Level[a]
	Soil	Sediment	Surface Water		
	RME Hazard Quotient				
Adult Recreationist	3.E-02	2.E-02	5.E-02	1.E-01	
Child Recreationist	**2.E+00**	8.E-01	5.E-01	**4.E+00**	1.E+00
Adult Worker	9.E-01	1.E-01	3.E-01	1.E+00	
	CTE Hazard Quotient				
Adult Recreationist	7.E-03	4.E-03	1.E-02	2.E-02	
Child Recreationist	8.E-02	4.E-02	3.E-02	1.E-01	1.E+00
Adult Worker	2.E-02	6.E-03	1.E-02	4.E-02	
	RME Cancer Risk				
Adult Recreationist	**6.E-06**	**4.E-06**	**1.E-05**	**2.E-05**	
Child Recreationist	**9.E-05**	**3.E-05**	**2.E-05**	**1.E-04**	1.E-06
Adult Worker	**2.E-04**	**2.E-05**	**5.E-05**	**2.E-04**	
	CTE Cancer Risk				
Adult Recreationist	4.E-07	2.E-07	6.E-07	1.E-06	
Child Recreationist	**3.E-06**	**2.E-06**	1.E-06	**6.E-06**	1.E-06
Adult Worker	1.E-06	3.E-07	7.E-07	**2.E-06**	

Notes:
CTE = Central tendency exposure
RME = Reasonable maximum exposure
[a]Oregon Department of Environmental Quality (ODEQ) 2000.

Table 7. Contaminant of Potential Ecological Concern Summary

CPEC	Soil/Waste Rock	Surface Water	Sediment	Pore Water
Aluminum		AL[1]		
Antimony	P		AL[1]	
Arsenic	P, I, B, M		AL	
Barium		AL[1]		
Cadmium			AL	
Chromium	P, I,		AL[1]	
Copper			AL[1]	
Iron	P, I,	AL[1]		
Lead	P, B		AL[1]	
Manganese	P, I,	AL[1]	AL[1]	
Mercury	P, I, B, M	AL	AL	AL
Nickel			AL	
Selenium	P, I, B, M	AL	AL	
Silver	P, I, B, M	AL		AL
Thallium			AL[1]	
Vanadium	P			
Zinc	P, I, B, M	AL	AL	AL

Notes:
Abbreviations: P – Plants; I – Invertebrates; B – Birds; M – Mammals; AL – Aquatic Life
[1]Ecological risk pertains to aquatic life in the adits or sediment basins only.

Table 8. Human Health and Ecological Contaminants of Potential Concern

Metal	Soil		Surface Water		Sediment		Pore Water	
	HH COPC	ECO COPEC	HH COPC	ECO COPEC	HH COPC	ECO COPEC	HH COPC	ECO COPEC
Aluminum				X [1]				
Antimony		X				X [1]		
Arsenic	X	X	X		X	X		
Barium				X [1]				
Beryllium								
Cadmium						X		
Chromium		X				X [1]		
Cobalt								
Copper						X [1]		
Iron		X		X [1]				
Lead	X	X	X			X [1]		
Manganese	X	X	X	X [1]	X	X [1]		
Mercury		X		X [2]		X		X [2]
Nickel						X		
Selenium		X		X [2]		X		
Silver		X		X [2, 3]		X [2, 3]		X [2, 3]
Thallium						X [1]		
Vanadium		X						
Zinc		X		X [2]		X		X [2]

Notes:
1. Ecological risk pertains to aquatic life in the adits or sediment basins only.
2. Constituent was identified as a COPEC based on its bioaccumulative potential only.
3. The detection limit was not adequate for assessing risk to aquatic life.
COPC = Contaminant of potential concern
COPEC = Contaminant of potential ecological concern
HH = Human health
ECO = Ecological

Table 9. Proposed Site Cleanup Criteria

Analyte	Waste Rock (mg/kg)	Sediment (mg/kg)	Surface Water[H] (µg/L)
Arsenic	152[R]	42[O]	10[D]
Cadmium	—[A]	4.2[O]	—[S]
Chromium (VI)	—[A]	—[S]	11[C]
Copper	—[A]	77.7[O]	12[C]
Iron	—[A]	—[N]	1,000[C]
Lead	—[A]	110[O]	3.2[C]
Mercury	—[A]	0.7[O]	0.1[B]
Nickel	—[A]	38.5[O]	160[C]
Selenium	—[A]	—[N]	35[C]
Silver	—[A]	1.8[O]	0.12[C]
Zinc	—[A]	270[O]	110[C]

Notes:
mg/kg = Milligram per kilogram
µg/L = Microgram per liter
A = Arsenic risk in waste rock exceeds that for other metals by more than a factor of 10, so their cleanup criteria were not determined.
B = Background level
C = freshwater aquatic life Chronic Criterion (OAR 340-041-0033 Table 20)
D = Drinking water Maximum Contaminant Level (after Jan. 23, 2006)
S = Below screening level (no cleanup level determined).
H = based on Hardness of 100 milligram/liter; actual cleanup level will depend on hardness of sample
N = No published criterion available
O = Oak Ridge National Laboratory criterion (Efromyson, et al, 1997)
R = Risk–based criterion for Oregon soil cleanup standard of an allowable total excess cancer risk of 1.E-05 (ODEQ 2000).

Table 10. Removal Action Technology Preliminary Screening Matrix

Technology Class	Process Option	Description	Effectiveness	Implementability	Cost	O&M	Land Impact	Pros	Cons	Retained?
No Action										
No action	**No action**	Leave feature(s) as is	0	0	0	none	none	Cheap, easy	No risk reduction	**Yes**
Institutional Controls										
Access restriction	Fencing, signs	Security fences around adits and waste piles	Medium	High	Low	Medium–subject to vandalism	Minimal	Simple	Doesn't protect ecoreceptors	No
	Road closure	Add signs to locked gate	Medium	High	Low	Medium–subject to vandalism	None	Simple; in effect already, except for mine & USFS workers	Doesn't protect ecoreceptors	No
Physical Hazards										
Access restriction	**Bat gates**	Install adit bat gates	High	High	Low	Medium—subject to vandalism	None	Reduce ecoreceptor exposure; maintain habitat	West adit difficult to access	**Yes**
	Backfill adits/shafts	Backfill open adits/shafts w/ waste rock, cover with soil, seed	Medium	High	Medium	Low–inspect for erosion	Low—soil removed from meadow; temp. roads (reclaimed)	Reduce physical hazard; Contain *some* waste	Could collapse due to settling	**Yes**
	Plug and backfill adits/shafts	Install PUF or concrete plug in addition to backfill+cover	Medium	High	Medium	Low–inspect for erosion	Minimal	Reduce physical hazard; Contain *some* waste; Safer: not as prone to collapse	Limited access requires road construction. Higher costs because of access difficulties.	No
	Demolish/bury cabins and exposed mine timbers/eqpt	Demolish cabins; remove timber piles cut supporting timbers at ground level; bury with stacks, etc;	High	High	Low	None	Minimal	Cheap, easy		**Yes**

Table 10. Removal Action Technology Preliminary Screening Matrix, Continued

Technology Class	Process Option	Description	Effectiveness	Implementability	Cost	O&M	Land Impact	Pros	Cons	Retained?
Engineering Controls										
Water containment	Adit plug	Install polyurethane or concrete plug to stop discharge	Low	High	Low	Medium—inspect for leakage	None		Prone to blowout due to increased head	No
	Infiltration	Infiltration gallery to divert adit discharge to groundwater	Low	Low	Medium				Unlikely to remove dissolved metals or affect solids precipitated upon air contact; May short–circuit to nearby stream; groundwater probably too shallow due to stream proximity	No
Surface controls	**Runoff diversion**	Regrade waste piles; add diversion channels	Medium	High	Medium	Minimal–clean channels	Low—channel	Reduce infiltration thru waste rock	Does not address dust	**Yes**
Solids containment	Evapotranspiration cover	Soil cover stores precipitation until it evaporates	Low	Low	Medium	Low–inspect for erosion	2-3ac stockpile & repository temp. roads (recl.)	Simple design/installation	Requires 7½ft soil cover for 26" precip if 30% porosity	No
	Geosynthetic cover	Multilayer: fines, geomembrane, soil & seed	High	High	High	Low–inspect for erosion		Eliminate infiltration; More forgiving installation than geosynthetics	Must be installed/tested correctly	**Yes**
	Clay cover	Bentonite or composite clay+geosynthetic cover + soil & seed	Low	Medium	Medium	High–clay subject to decomposition		Nearly eliminate infiltration; More forgiving installation than geosynthetics	Clay prone to decomposition from desiccation and freeze/thaw (2004)	No
	Biological cover	Add carbohydrate– or protein–based nutrient mixes to cover soil	Medium	High	Medium	Low–inspect for erosion		Reduced leachate metals conc. (EPA 2000c)	Strongly depends on mixture; design parameters not developed (EPA 2000c)	No
	Cementitious cover	Fiber–reinforced concrete/mortar cover	High	Medium	High	Low–inspect for erosion		Reduce leachate metals conc.	Subject to cracking; not natural looking	No
	Polyurethane grout	Spray cover of polyurethane grout to inhibit infiltration	Medium	Medium	Medium	Low–inspect for erosion		Reduced infiltration, leachate metals conc. < MCLs (EPA 2000c); More plasticity than cement grouts	Long term stability unknown (EPA 2000c)	No

Table 10. Removal Action Technology Preliminary Screening Matrix, Continued

Technology Class	Process Option	Description	Effective–ness	Implemen–tability	Cost	O&M	Land Impact	Pros	Cons	Retained?
Land Disposal										
On-site repository	**Constructed respository**	Excavate waste rock and place in on–site repository with or without geosynthetic cover	High	High	Medium	Medium—inspect cap and analyze leachate reclaim temp. roads	Temporary roads (reclaimed)	Exposure reduced	Require temp. roads;	**Yes**
Off-site disposal	**RCRA landfill**	Excavate waste rock and dispose in RCRA–C landfill	High	High	High	Low–material hauled off site; reclaim temp. roads	Temporary roads (reclaimed)	Exposure reduced	Require temp. roads; Risk of highway spills	**Yes**
Treatment										
Solidification/Stabilization	Stabilization	Inject waste rock with cement or other material to physically stabilize	High	High	Medium	Low–inspect for erosion/settling	Temporary roads (reclaimed)		Require temp. roads; Piles mostly stable already	No
Vitrification	Vitrification	Heat waste rock >2800ºF to melt minerals	High	Low	High	Low–inspect for erosion/settling	Temporary roads (reclaimed)		Require temp. roads; High energy cost; No site electricity	No
Washing	Washing	Excavate and wash waste rock with aqueous solution	Medium	Low	High	Low–inspect for erosion/settling	Temporary roads (reclaimed)		Require temp. roads; Requires water; Chemical disposal req'd	No
Settling pond	**Settling pond**	Repair/construct settling pond to remove fines	Medium	High	Medium	Medium—excavate/dispose of sediments every few years	<0.1ac per pond	Reduce sediment load to creek; Use as pretreatment	Only reduces sediments and precipitates formed on air contact	**Yes**
Biotreatment	Anaerobic wetland	Downflow anaerobic wetland with wooden baffles	Low	Medium	High	Replace baffles and medium every 20yr	~0.3ac for wetlands	No pumps/motors; Less prone to freezing	Less effective in winter	No
	Aerobic wetland	Surface flow over gravel/organic layer	Medium	Medium	High	Dredge sediment, replace medium /20yr	<0.2 ac per wetland	Passive systems are BPT under NPDES	Less effective in winter	**Yes**
	SRB bioreactor	Series of buried trenches containing cobbles and organic matter (*e.g.*, manure)	Medium	Low	High	Add methanol to reactivate carbon source (Tsukamoto & Miller 1999)	~1ac for reactor	No pumps/motors;	Subject to freezing; Req. too much room (980sf/gpm) (EPA 2000c)	No
	Pyrolusite®	limestone–filled beds inoculated with proprietary aerobic microorganism population (Allegheny Mineral Abatement)	Medium	Low	High	Remove clogging sludge	40'x120'x5' area treated 30gpm at Laurel Run (Milavic 2002)	Claims 99.97% Fe/Mn removal; Success at one Penna. site (Milavec 2002); current trial on Wayne N.F. (USFS 2004); No pumps/motors	Severe clogging (Milavec 2005); Req. carbon source (e.g., upstream wetland); Subject to freezing	No

Table 11. Comparison of Removal Alternatives

Assessment Criteria		Alternative 1 No action	Alternative 2 Excavation and Off-site Disposal	Alternative 3 Excavation and On-site Disposal	Alternative 4 Adit Discharge Treatment
Overall Protectiveness of Public Health, Safety and Welfare		No protection	Protects human receptors and mitigates physical hazards.	Protects human receptors and mitigates physical hazards.	Protects human receptors
Environmental Protectiveness		No protection	Protects ecological receptors and prevents contaminant transport.	Protects ecological receptors and minimizes potential for contaminant transport.	Protects ecological receptors in stream. Sediment pond and wetlands may be potential point of exposure.
Compliance with ARARs		Does not comply	Complies	Complies	May require construction of both features (sediment pond and wetlands) to comply.
Long Term Effectiveness and Permanence		None	Provides long-term permanence. Bat gates may be subject to vandalism. Backfilled shafts and adits may be prone to collapse.	Provides long-term permanence. Bat gates may be subject to vandalism. Backfilled shafts and adits may be prone to collapse.	Will require periodic removal and disposal of sludge and replacement of wetland organic substrate.
Reduction of Toxicity, Mobility and Volume		None	No reduction but waste is removed from site.	No reduction but waste is contained and potential exposure is significantly reduced. Cover option b will be more effective at minimizing potential contaminant transport.	Yes by precipitation and settling.
Short-Term Effectiveness		None	Easily constructed and risks to community and workers will be minimal.	Easily constructed and does not require off-site transport of waste. Risks to community and workers will be minimal.	Easily constructed and does not require off-site transport of waste. Risks to community and workers will be minimal.
Implementability		Not applicable	Easily implemented and technically and administratively feasible.	Easily implemented and technically and administratively feasible.	Easily implemented at Magnolia. Construction at Ajax may be more difficult because of limited area and riparian zone.
State and Federal Agency and Community Acceptance		Not acceptable	Acceptable	Acceptable	Acceptable
Cost	**Ajax**	$0	$368,156	Cover Option 1 = $227,936 Cover Option 2 = $194,348	Sediment Pond = $23,585 Anaerobic Wetland = $58,146
	Magnolia	$0	$814,345	Cover Option 1 = $436,397 Cover Option 2 = $368,382	Sediment Pond = $33,653 Anaerobic Wetland = $75,888

Figures

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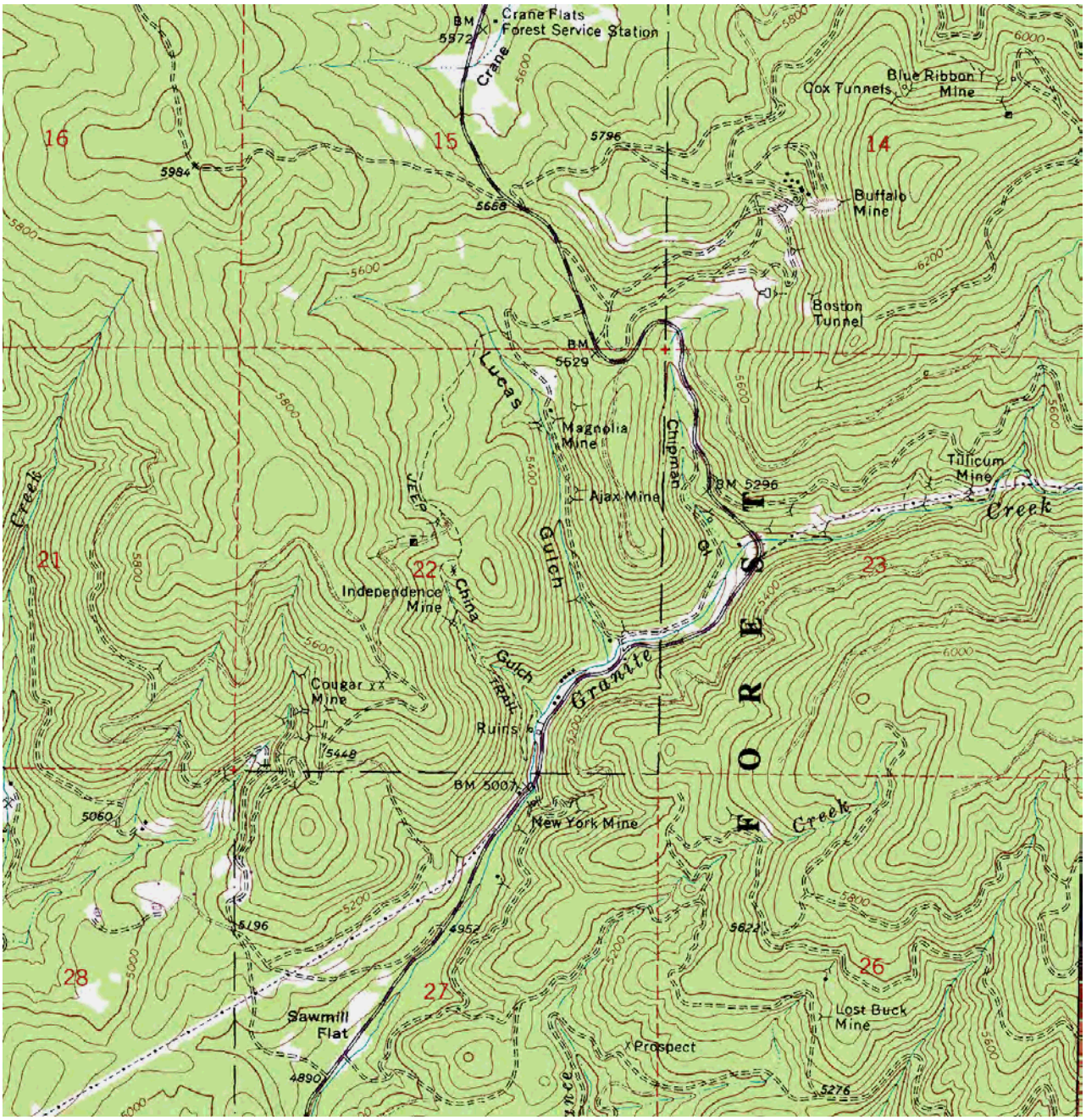

Adapted from the 7½–minute *Granite, Oregon* quadrangle (USGS)



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VICINITY MAP

AJAX/MAGNOLIA MINE SITE
Umatilla National Forest
Near Granite, Oregon

B2473A	01/05/2005	1 inch ≈ 2,000 feet	FIGURE 1

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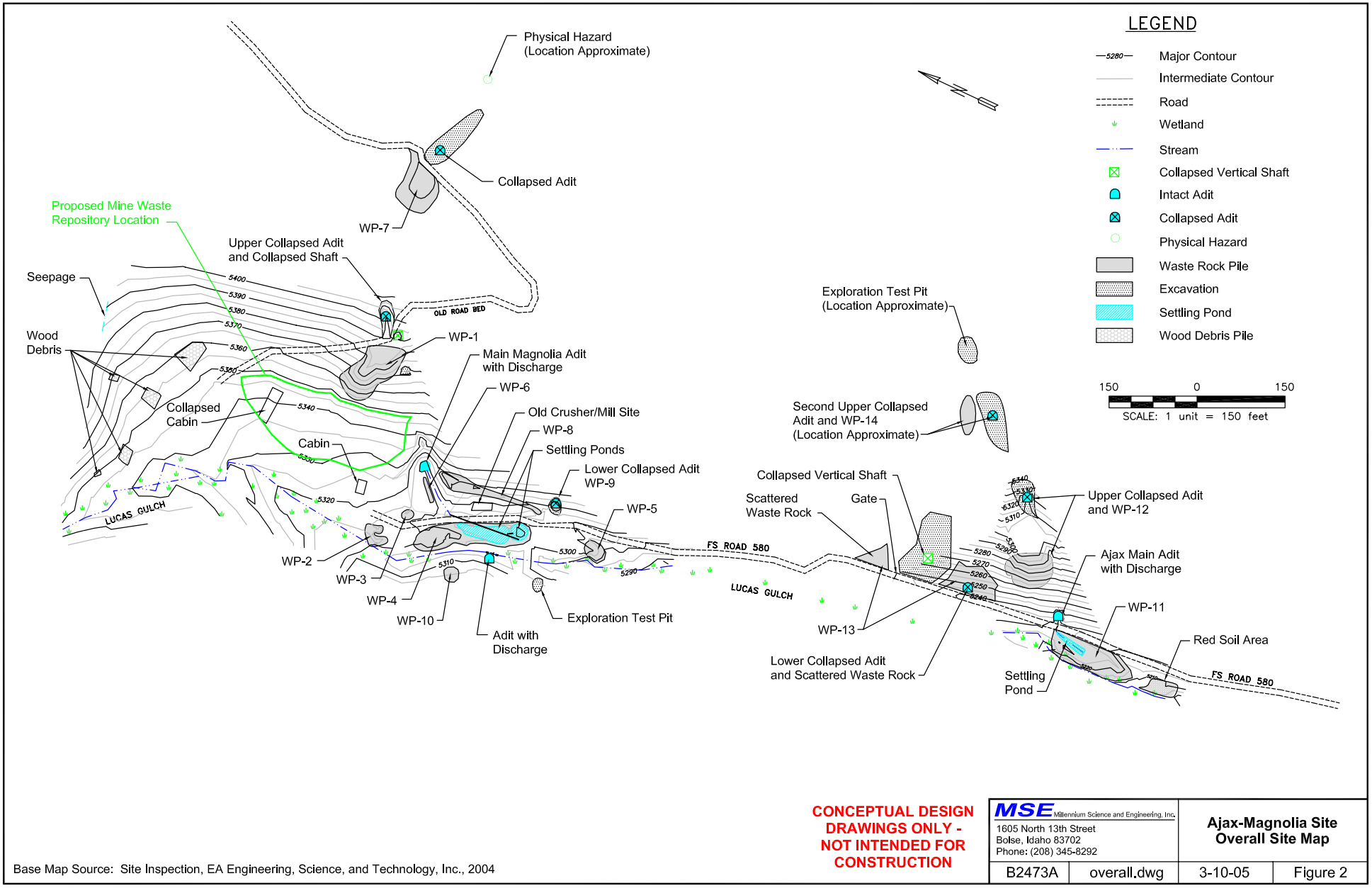

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Base Map Source: Site Inspection, EA Engineering, Science, and Technology, Inc., 2004

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Ajax-Magnolia Site Overall Site Map

B2473A	overall.dwg	3-10-05	Figure 2

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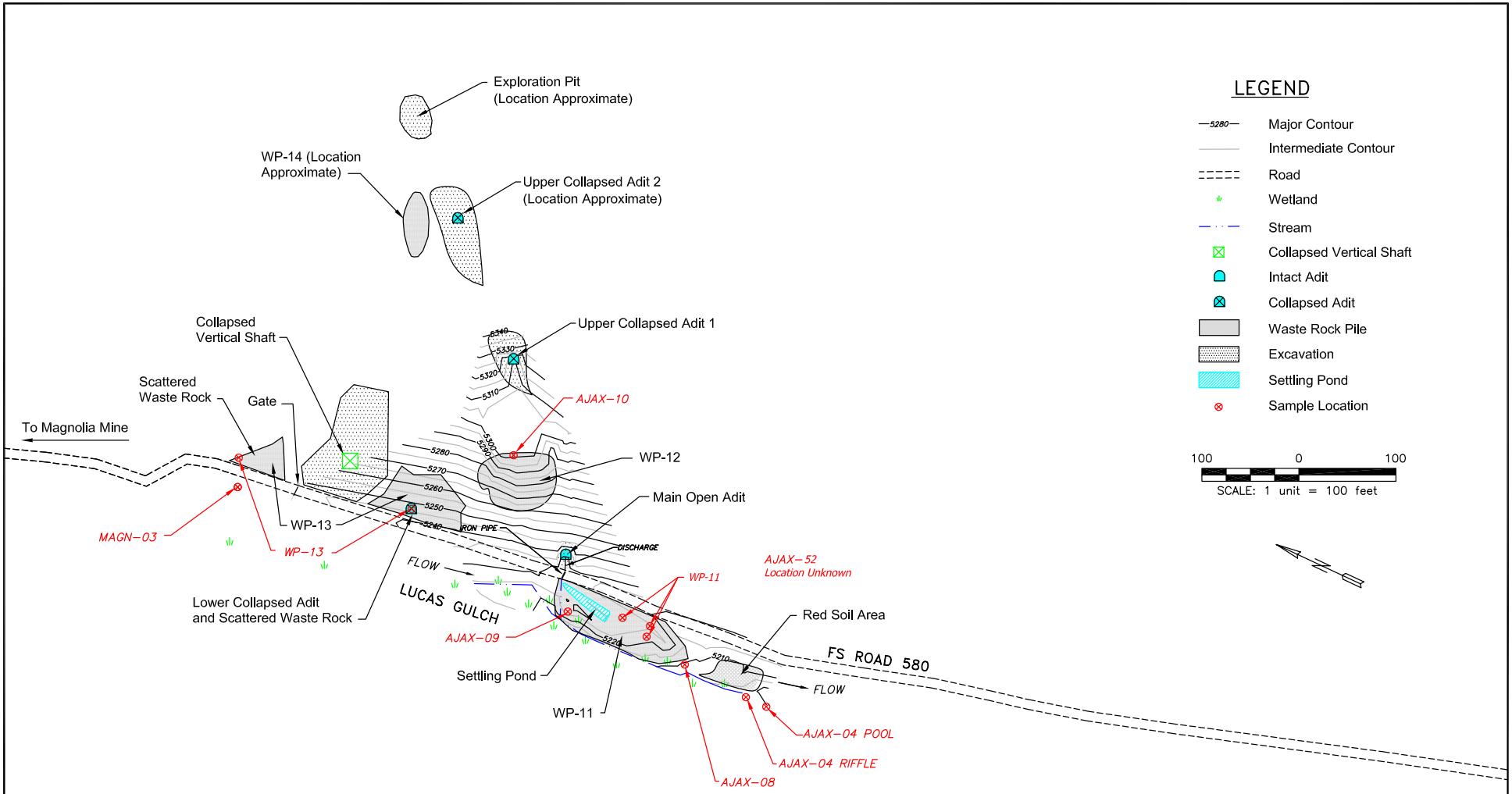

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Ajax Mine
Site Map

B2473A	ajax.dwg	3-10-05	Figure 3

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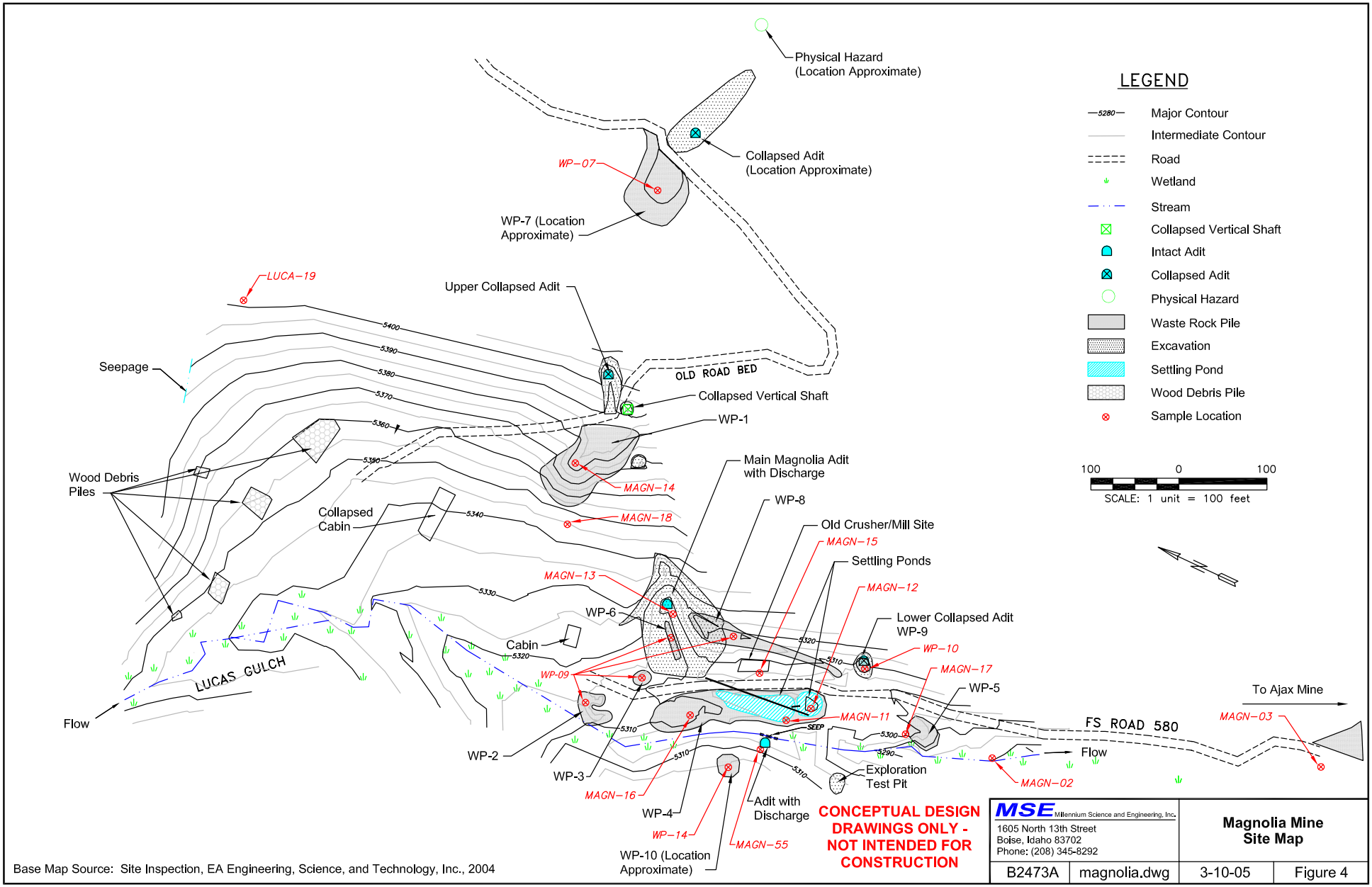
Physical Hazard
(Location Approximate)
Collapsed Adit
(Location Approximate)
WP-07
WP-7 (Location
Approximate)
LUCA-19
Upper Collapsed Adit
Seepage
OLD ROAD BED
Collapsed Vertical Shaft
WP-1
Main Magnolia Adit
with Discharge
Wood Debris
Piles
MAGN-14
MAGN-18
Collapsed
Cabin
WP-8
Old Crusher/Mill Site
MAGN-15
Settling Ponds
MAGN-13
MAGN-12
WP-6
Lower Collapsed Adit
WP-9
Cabin
WP-10
MAGN-17
WP-09
WP-5
LUCAS GULCH
Flow
MAGN-11
SEEP
To Ajax Mine
MAGN-03
FS ROAD 580
WP-2
Flow
WP-3
Exploration
Test Pit
MAGN-02
MAGN-16
WP-4
Adit with
Discharge
WP-14
MAGN-55
WP-10 (Location
Approximate)
5400
5390
5380
5370
5360
5350
5340
5330
5320
5310
5300
5290
LEGEND
5280
Major Contour
Intermediate Contour
Road
Wetland
Stream
Collapsed Vertical Shaft
Intact Adit
Collapsed Adit
Physical Hazard
Waste Rock Pile
Excavation
Settling Pond
Wood Debris Pile
Sample Location
100 0 100
SCALE: 1 unit = 100 feet
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Magnolia Mine
Site Map
B2473A
magnolia.dwg
3-10-05
Figure 4
Base Map Source: Site Inspection, EA Engineering, Science, and Technology, Inc., 2004

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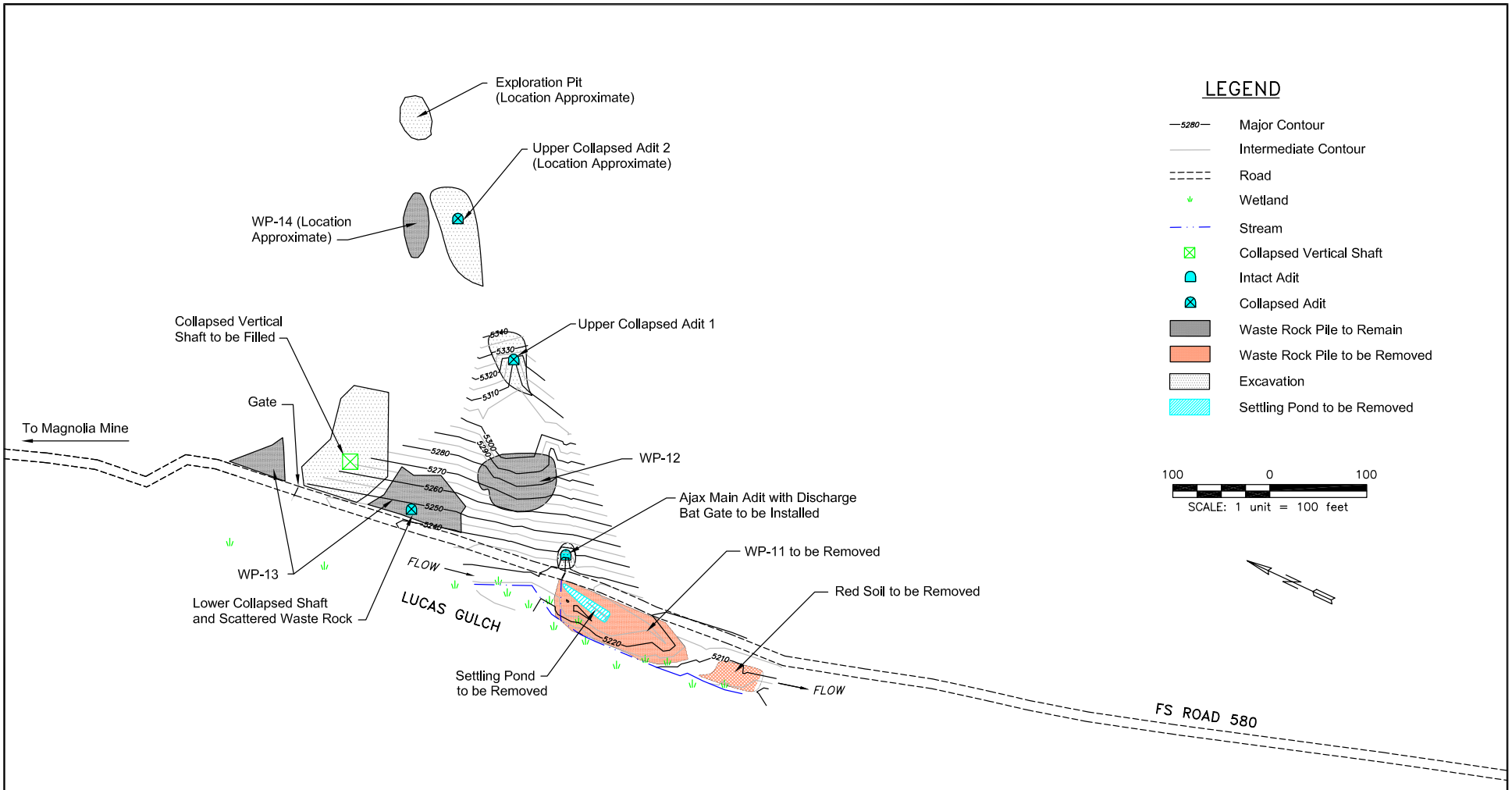

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Ajax Mine
Removal Actions

B2473A	ajax-final.dwg	3-10-05	Figure 5

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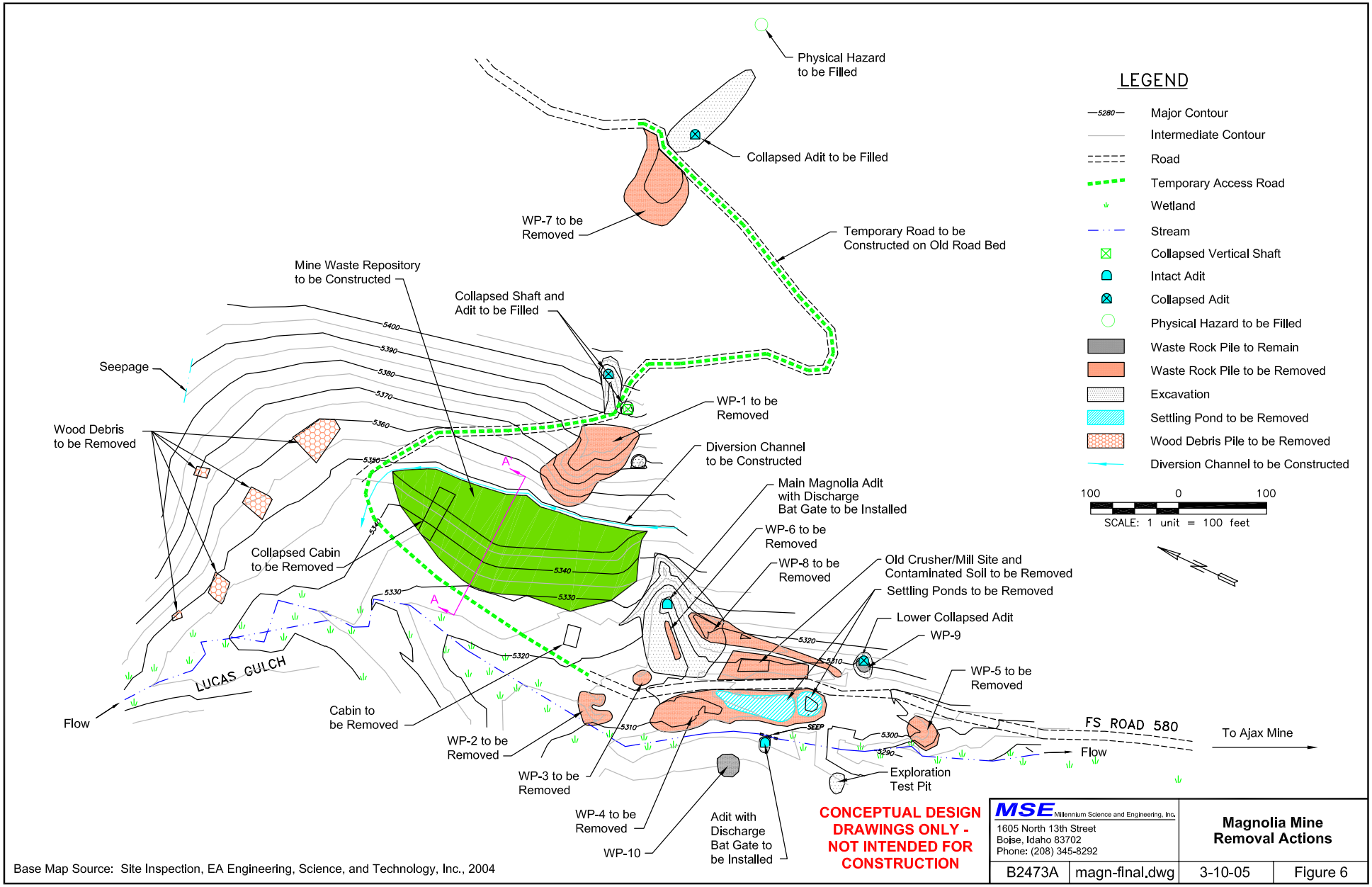

Base Map Source: Site Inspection, EA Engineering, Science, and Technology, Inc., 2004

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Magnolia Mine Removal Actions

B2473A	magn-final.dwg	3-10-05	Figure 6

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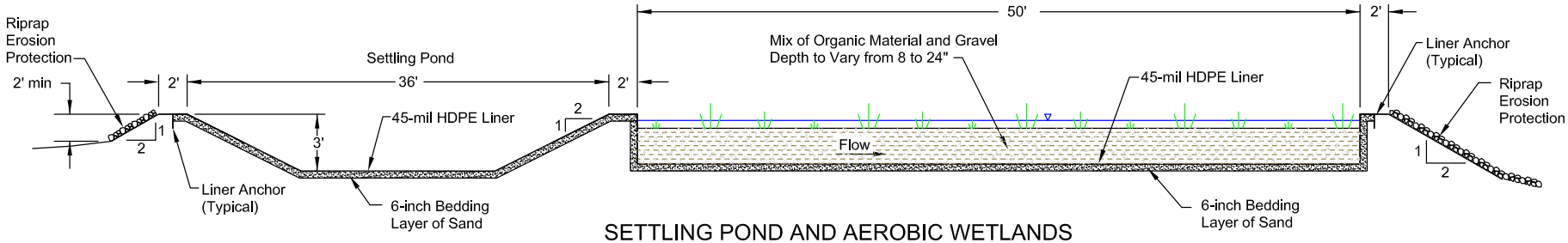
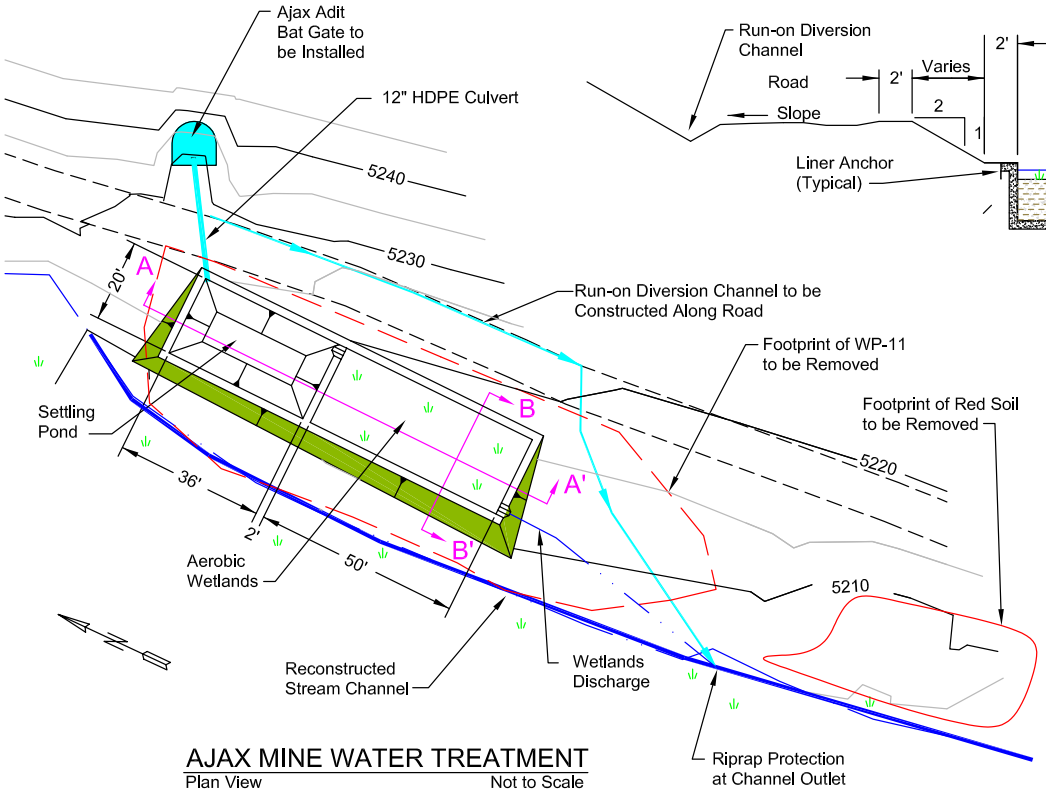


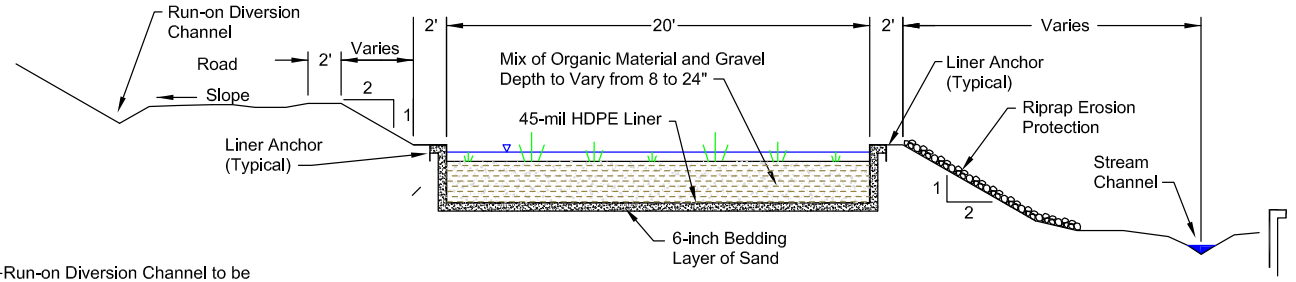
SETTLING POND AND AEROBIC WETLANDS

Cross Section A-A' Not to Scale



AJAX MINE WATER TREATMENT

Plan View Not to Scale



AEROBIC WETLANDS

Cross Section B-B' Not to Scale

LEGEND

- 5280 Major Contour
- Intermediate Contour
- Road
- Wetland
- Stream
- Intact Adit
- Diversion Channel
- Waste Rock Pile

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Ajax Mine Water Treatment System

B2473A	ajax-WT.dwg	3-10-05	Figure 7

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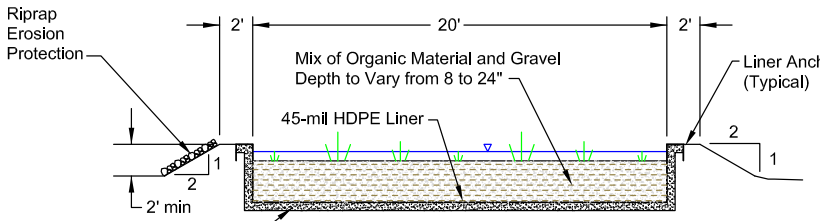
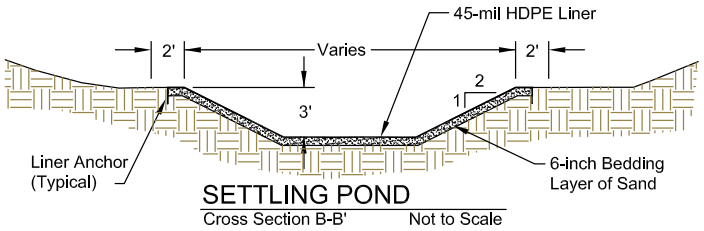
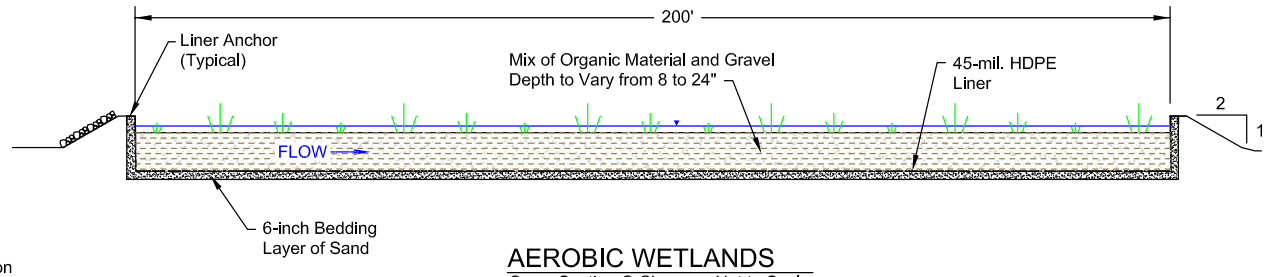


AEROBIC WETLANDS
Cross Section A-A' Not to Scale



SETTLING POND
Cross Section B-B' Not to Scale



AEROBIC WETLANDS
Cross Section C-C' Not to Scale

MAGNOLIA MINE WATER TREATMENT
Plan View Not to Scale

LEGEND

- Major Contour (5280)
- Intermediate Contour
- Road
- Wetland
- Stream
- Intact Adit
- Collapsed Adit
- Waste Rock to be Removed

CONCEPTUAL DESIGN DRAWINGS ONLY - NOT INTENDED FOR CONSTRUCTION

MSE Millennium Science and Engineering, Inc.
1605 North 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292

Magnolia Mine Water Treatment System

B2473A	mag-wt.dwg	3-10-05	Figure 8

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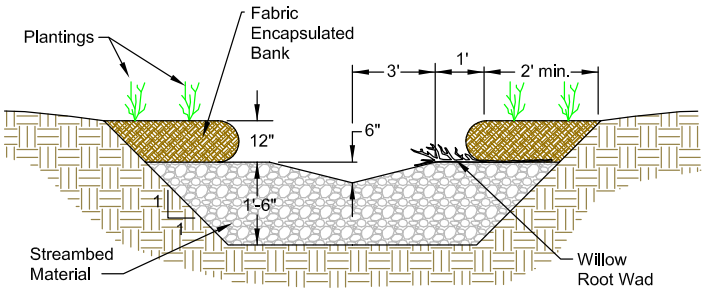
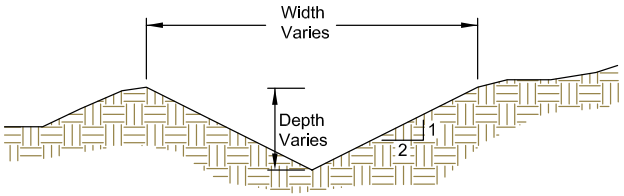


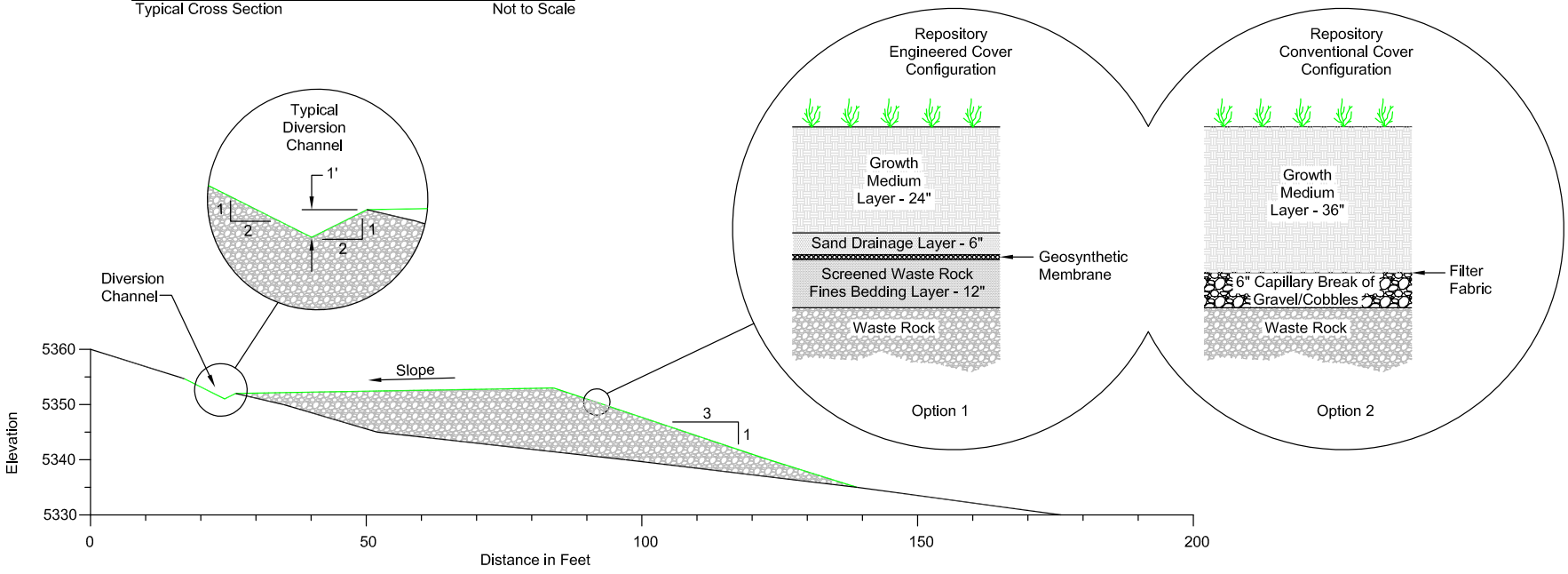
STREAM CHANNEL RECONSTRUCTION

Typical Cross Section Not to Scale



Run-on Diversion Channel

Typical Cross Section Not to Scale



REPOSITORY CROSS SECTION

Cross Section and Details Not to Scale

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1605 North 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292

Ajax-Magnolia Mine Reclamation Details

B2473A	details.dwg	3-10-05	Figure 9

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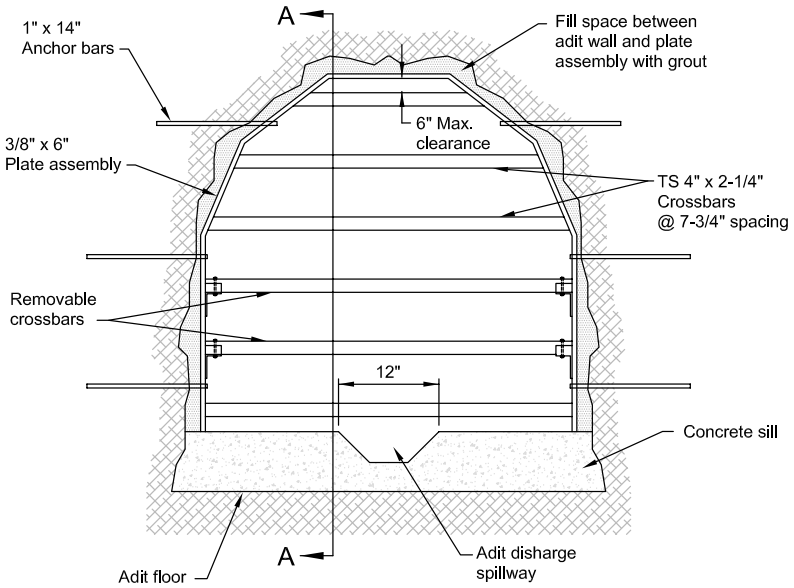
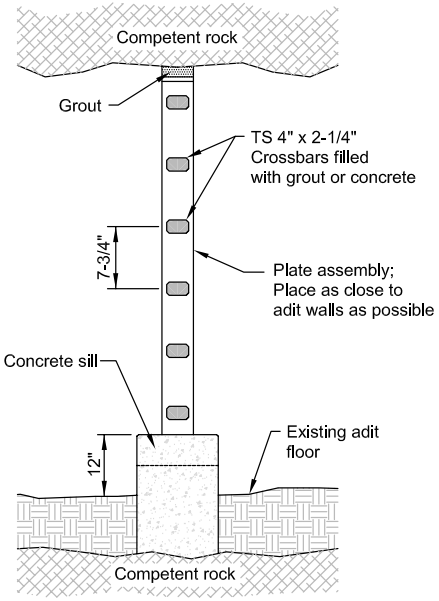


BAT GATE ELEVATION

Not to scale



SECTION A-A

Not to scale

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1605 North 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292

Ajax-Magnolia Mine
Bat Gate Details

B2473A	batgate.dwg	3-10-05	Figure 10

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APPENDIX A

STREAMLINED
HUMAN HEALTH RISK ASSESSMENT

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1.0 INTRODUCTION

This streamlined human health risk assessment (HHRA) was prepared to evaluate risks associated with exposure to mining-related contaminants at the Ajax and Magnolia Mines, near Granite, Oregon. The HHRA incorporates analytical data and other information gathered during the Site Inspection (SI), subsequent site visits, and additional soil sampling by Millennium Science and Engineering, Inc. (MSE). Because of the proximity and similarities between the Ajax and Magnolia Mines, and the limited analytical data, the two mines were evaluated as one site for the purposes of this HHRA.

The HHRA was prepared in accordance with the Oregon Department of Environmental Quality's (ODEQ's) guidance for Conduct of Deterministic Human Health Risk Assessments (ODEQ 2000), and U.S. Environmental Protection Agency (EPA) Risk Assessment Guidance for Superfund (RAGS), Volumes 1 and 2 (EPA 1991). This report summarizes the risk assessment methodology, assumptions, and estimated potential risks to human receptors, and is organized into the following sections:

- Exposure Assessment
- Toxicity Assessment
- Risk Characterization
- Uncertainty Analysis
- Summary of Risks

2.0 EXPOSURE ASSESSMENT

Objectives of the exposure assessment are to: (1) identify potentially exposed populations and exposure pathways, (2) identify contaminants of potential concern (COPCs) at the site, (3) and estimate exposures to receptors. For the purposes of this risk assessment, both reasonable maximum exposure (RME) and central tendency exposure (CTE) scenarios were evaluated. The RME scenario is intended to be a very conservative estimate of potential exposure at the site while the CTE scenario is typically more realistic. The following sections discuss the conceptual site model (CSM), potentially exposed populations, potentially complete exposure routes, a summary of existing data, COPC screening and identification, exposure concentrations and factors, and the calculated daily intake rates.

2.1 Conceptual Site Model

A CSM provides the framework for assessing risk by identifying the contaminant sources, transport mechanisms, and potential exposure pathways, exposure routes, and receptors. A human health CSM identifies:

- The environmental setting and contaminants known or suspected to exist at the site
- Contaminant fate and transport mechanisms that might exist at the site
- Mechanisms of toxicity associated with contaminants and potential receptors
- Complete exposure pathways that might exist at the site
- Potential exposed populations

The human health CSM developed for the Ajax-Magnolia site based on existing data and the current and likely future conditions at the site is shown in Figure A.1.

2.2 Potentially Exposed Populations

The Ajax-Magnolia site is in a remote location with limited human access. Current land use includes active mining claims but recent activities have been limited to maintenance of the site rather than active mining. A cabin used for storage is on the Magnolia claim but the site does not appear to be occupied on a regular basis; therefore, the risk of long-term exposure to contaminants at the site is considered low. Access to the site is restricted by a locked gate and the site is closed to the public. There are no developed recreational areas near the site; however, hikers or hunters may occasionally traverse the site. Future uses of the site are expected to remain the same as current uses and may include mining, and recreational activities such as hiking and hunting. Residential development of the site is believed to be unlikely.

The potentially exposed populations evaluated in the Ajax-Magnolia HHRA include:

- Recreationist – Adult Receptor
- Recreationist – Child Receptor
- Worker – Adult Receptor

2.3 Potentially Complete Exposure Routes

Based on the potentially exposed populations, exposure pathways evaluated in the Ajax-Magnolia HHRA include:

- Incidental ingestion of soil and sediment
- Ingestion of surface water
- Dermal contact with soil, surface water, and sediment
- Inhalation of soil particulates

Other potentially complete pathways were qualitatively considered but not quantified, including fish tissue ingestion, groundwater ingestion, and plant ingestion.

Recreational fishing is prohibited in Granite Creek and its tributaries by the Oregon Department of Fish and Wildlife (ODFW) to protect Chinook salmon. Tribal fishing is allowed, but because of the relatively small drainage and low flow conditions, fish in Lucas Gulch are expected to be limited to smaller specimens not considered suitable for human consumption. Therefore, ingestion of fish tissue was determined to be an insignificant exposure pathway at the site. There is no current groundwater use at the site and the nearest water supply well is more than 3 miles from the site. No palatable species of plants were observed at the site and it's unlikely that the site will be used for agricultural cultivation; therefore, plant ingestion was determined to be an insignificant pathway at the site.

2.4 Summary of Existing Data

Analytical data used in the HHRA consisted of: (1) results of soil samples recently collected by MSE, and (2) samples collected by EA Engineering, Science and Technology, Inc. (EA) during the SI (EA 2004). In September 2004, MSE field staff collected a total of six soil samples from waste rock piles at the Ajax-Magnolia site. The samples were submitted to a laboratory for analysis of pH, Target Analyte List (TAL) metals, chromium VI, and cyanide.

During the SI, EA collected a total of 52 samples consisting of 12 surface water samples, 6 pore water samples, 12 sediment samples, 13 soil samples, and 9 plant tissue samples.

Of the 52 total samples, 19 were collected from areas intended to be representative of background conditions at the site. However, the majority (14) of those samples were collected from a different drainage system and may not be representative of background conditions specific to the Ajax-Magnolia site. Within Lucas Gulch, only one soil and one plant sample were collected from a single location (LUCA-19) up gradient of mining disturbances; likewise, only one surface water, one pore water, and one sediment sample were collected from a single location (MAGN-01) upstream of the Magnolia site. These two locations are considered to be most representative of background conditions at the Ajax-Magnolia site; therefore, only data from the samples collected at these two locations were used to establish background concentrations used in the HHRA.

Compounds analyzed for but not detected were reported at the method detection limit (MDL) and compounds detected at concentrations between the MDL and the practical quantitation limit (PQL) were reported at the detected concentration. For determining average concentrations, non-detect samples were included at concentrations equal to ½ the method detection limit (MDL) in accordance with EPA guidance (EPA 1991). Analytical results for surface water included both dissolved and total metals concentrations; however, contrary to logic, dissolved concentrations of some compounds exceeded the totals concentration in the same sample. To be conservative, the higher of the two values was used in this HHRA.

2.5 Identification of Contaminants of Potential Concern

COPCs are compounds detected at the site that exceed risk-based screening levels and are used in the HHRA to evaluate potential risk to human receptors. COPCs are selected on the basis of detection levels, background concentrations, and potential toxicity. In accordance with ODEQ and EPA guidance, analytical data collected from the site were pre-screened to identify the COPCs based on the following criteria:

Frequency of Detection – Compounds detected in less than 5 percent of the samples site-wide for a given media were eliminated from further screening.

Comparison with Background Concentrations – Compounds with maximum detected concentrations (MDCs) below background levels were eliminated from further screening.

Concentration-risk Screening – MDCs of the remaining compounds were compared with EPA Region IX Preliminary Remediation Goals (PRGs). Because of the remoteness of the site and limited public access, Industrial Soil PRGs were used for soil and sediment, and EPA Region IX Tap Water PRGs were used for surface water (EPA 2004a). The screening also was conducted to evaluate potential cumulative effects of individual compounds across multiple media, as well as multiple compounds within each media and across multiple media. Compounds without PRGs, such as lead, were retained as COPCs for a qualitative evaluation and are discussed where appropriate, and in the uncertainty analysis in Section 5.

Surface water sample results were also compared with ODEQ water quality criteria for protection of human health (OAR 340-041-001). Metals exceeding ODEQ criteria included arsenic, iron, manganese, mercury, and nickel. Arsenic and manganese were included as COPCs in the screening process described above. For iron, manganese, and nickel, with the exception of one sample, all exceedances were in samples from adit disharge or the settling ponds. The only stream sample exceeding ODEQ criteria for these metals was collected from the wetland area immediately downstream of the waste rock pile (WP-11) in Lucas Gulch at the Ajax Mine. Because the ODEQ criteria is based on water *and* fish ingestion, the corresponding risks implied by exceedances in surface water at this site are likely over estimated since the adit discharge and settling ponds do not contain fish. This also is true for the Lucas Gulch stream because recreational fishing is prohibited. Tribal fishing is allowed; however, most specimens would be too small for human consumption because of the size and nature of the stream. In addition, iron and manganese criteria limitations in water are typically based on aesthetic considerations, such as staining and taste, rather than adverse health effects. Therefore, the COPCs selected for surface water at the site are based on the screening process discussed above, and include arsenic, lead, and manganese.

Soil sample results were compared to EPA generic soil screening levels (SSLs) for the protection of human health. Metals exceeding the SSLs included arsenic, antimony, beryllium, and lead. Arsenic and lead were already identified as COPCs in the initial screening process. Antimony concentrations exceeded the SSL at only two locations, and beryllium concentrations exceeded the SSL at all but one of the locations. However, SSLs were developed based on residential land use assumptions, which are not applicable to this site for the assumed exposure pathways. Therefore, no additional COPCs were selected based on the comparison with SSLs.

Based on results of the COPC screening process, the compounds presented in Table A.1 were identified as COPCs for the Ajax-Magnolia HHRA. Iron, calcium, magnesium, potassium, and sodium were screened out as essential nutrients. Thallium was eliminated as a COPC for surface water because it was detected in only two samples and at concentrations reported between the MDL and PQL.

Table A.1. Human Health Contaminants of Potential Concern

Contaminant of Potential Concern	Media			
	Soil	Surface Water	Sediment	Multimedia
Arsenic	X	X	X	X
Lead	X	X		X
Manganese	X	X	X	X

2.6 Exposure Point Concentrations

Exposure point concentrations (EPCs) were developed from site-specific data and represent the concentration of each COPC that a receptor will potentially contact during the exposure period. Because of the uncertainty associated with estimating the true average concentration at a site, ODEQ guidance recommends using the 90 percent upper confidence limit (UCL_{90}) of the arithmetic mean (ODEQ 2000). However, data sets with fewer than 10 data samples can provide statistically unreliable estimates of the true mean and the EPA recommends using the MDC as the EPC for the RME scenario. Therefore, because soil was the only media with more than 10 samples, MDCs were used for sediment and surface water EPCs.

For soil, UCL_{90s} were calculated using ODEQ's downloadable spreadsheet at www.deq.state.or.us/wmc/tank/ucls.htm for calculating UCL_{90}. In accordance with ODEQ guidance, the data first were evaluated for both normal and logarithmic distributions. For data distributions that were

rejected for both normal and logarithmic distributions, Chebyshev's formula for nonparametric data was used to calculate the UCL_{90} in accordance with EPA guidance (EPA 2002).

For the CTE scenario, the arithmetic mean concentration was used as the EPC for all media in accordance with EPA guidance. The EPCs used in the Ajax-Magnolia HHRA are summarized in Table A.2.

Table A.2. Exposure Point Concentration Summary

Analyte	Exposure Point Concentrations					
	RME			CTE		
	Soil (mg/kg)	Surface Water (µg/L)	Sediment (mg/kg)	Soil (mg/kg)	Surface Water (µg/L)	Sediment (mg/kg)
Arsenic	2,520	239	2,800	643	44	987
Lead	1,210	1.70	69	390	1.01	35.4
Manganese	19,300	1,740	40,600	3,436	386	7,748

Notes:
CTE = central tendency exposure; RME = reasonable maximum exposure
mg/kg = Milligram per kilogram
µg/L = Microgram per liter

2.7 Exposure Factors and Assumptions

Exposure factors (EFs) are variables that are combined with EPCs to calculate contaminant exposures for potential receptors (e.g., body weight, exposure frequency and duration, averaging time, intake rates, chemical bioavailability, etc.). EFs are typically derived from a combination of site-specific conditions and standard default values presented in risk assessment guidance documents. Site-specific values are typically limited to event frequencies. The EFs used in the Ajax-Magnolia HHRA were developed in accordance with EPA and ODEQ guidance and are summarized in Table A.3.

Because the site is closed to the public and access is limited by a locked gate, recreational use is expected to be minimal. The assumed exposure frequencies are based on: (1) limited recreational use by hunters or hikers traversing the site, and (2) minimal site maintenance activities. For the adult worker, the exposure frequency is based on surface activities only; underground operations would constitute an occupational exposure outside the scope of this risk assessment.

3.0 TOXICITY ASSESSMENT

The objective of toxicity assessment is to identify specific toxicological properties of the COPCs for the purposes of evaluating the risk of exposure. Once site-specific COPCs have been identified, the toxicological properties are evaluated to determine the types and severity of potential health hazards associated with exposure to the COPCs. Toxicities vary significantly depending on carcinogenic or non-carcinogenic responses and exposure to some chemicals may result in both carcinogenic and non-carcinogenic effects.

Table A.3. Exposure Factors Summary

Exposure Factor	Units	Recreationist				Worker		Source
		Child		Adult		Adult		
		CTE	RME	CTE	RME	CTE	RME	
Body Weight	kg	15	15	70	70	70	70	
Exposure Frequency:								
Soil	day/yr	1	2	1	2	2	4	Site specific
Sediment	day/yr	1	2	1	2	2	4	Site specific
Surface Water	day/yr	1	2	1	2	2	4	Site specific
Event Time:								
Surface Water	hr/event	2	2	2	2	4	8	Site specific
Event Frequency	event/day	1	1	1	1	1	1	Site specific
Exposure Duration	year	6	6	9	10	6	25	ODEQ 2000
Averaging Time:								
Carcinogens	day	25550	25550	25550	25550	25550	25550	EPA 1989
Noncarcinogens	day	2190	2190	3285	10950	3285	10950	EPA 1989
Intake Factors								
Incidental Ingestion of Soil	mg/day	100	400	50	100	100	480	ODEQ 2000
Incidental Ingestion of Sediment	mg/day	50	200	25	50	25	50	Amity EE/CA
Incidental Ingestion of Surface Water	mL/day	0.9	1.5	1.4	2.3	1.4	2.3	EPA 1997
Exposed Skin Surface Area	cm^2	4500	5000	5200	6900	3200	4100	EPA 2004b
Inhalation Rate	m^3/hr	1.2	1.9	1.6	3.2	1.5	2.5	ODEQ 2000
Dermal Absorption Factors:								
Inorganics		0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03	0.01-0.03	Comp. specific
Soil Adherence Factor	mg/cm^2-event	0.04	0.2	0.01	0.07	0.02	0.2	EPA 2004b
Particulate Emission Factor	mg^3/kg	1.32E+09	1.32E+09	1.32E+09	1.32E+09	1.32E+09	1.32E+09	EPA 2000

Notes:
EPA 1997. "Exposure Factors Handbook." Volumes I through III. EPA Office of Research and Development. August.
EPA 2000. "Region IV Preliminary Remediation Goals." 2000 Update. EPA. November.
EPA 2004b. "Risk Assessment Guide for Superfund, Part E, Supplemental Guidance for Dermal Risk Assessment." Volume I: Human Health Evaluation Model. EPA Office of Superfund Remediation and Technology Innovation. July.
ODEQ 2000. "Guidance for Conduct of Deterministic Human Health Risk Assessment." Final. ODEQ. Updated May.
CTE = central tendency exposure; RME = reasonable maximum exposure
cm^2 = Square centimeter
day/yr = Day per year
event/day = Event per day
hr/event = Hour per event
kg = Kilogram
m^2/day = Square meter per day
m^3/kg = Cubic meter per kilogram
m^3/hr = Cubic meter per hour
mg/day = Milligram per day
mg/cm^2-event = Milligram per square centimeter per event
mL/day = Milliliter per day

3.1 Toxicity Values

Standard databases of toxicological properties have been developed from laboratory and epidemiological studies. The primary sources for toxicity data are EPA's Integrated Risk Information System (IRIS) and Health Effects Assessment Summary Tables (HEAST). In accordance with ODEQ guidance, the hierarchy for toxicity data used in this risk assessment was:

1) IRIS
2) HEAST

If toxicological properties for a specific chemical were in neither IRIS nor HEAST tables, additional sources such EPA's National Center for Environmental Risk Assessment (NCEA), Agency for Toxic Substances Disease Registry (ATSDR) Toxicological Profiles, or EPA Provisional Peer Reviewed Toxicity Values (PPRTVs) were used.

Most toxicity values are presented for both chronic and subchronic exposure periods. Subchronic exposures can vary from 2 weeks to 7 years (EPA 1991) and may be most representative of actual exposure times at the site. However, to be conservative, chronic toxicity values were used in this risk assessment.

A summary of the non-carcinogenic and carcinogenic toxicological properties used in this risk assessment is provided in Tables A.4 and A.5 on page 8, respectively.

3.1.1 Non-carcinogenic Toxicity

The toxicity of non-carcinogenic COPCs is evaluated using reference doses (RfDs) developed from toxicological literature based on critical human and animal studies. When possible, human toxicological data are used; however, if human data are not available, a study using the most sensitive animal species is used. The RfDs used in this risk assessment are summarized in Table A.4.

3.1.2 Carcinogenic Toxicity

Carcinogenic toxicity is not assumed to have a threshold concentration below which adverse effects do not occur. Therefore, carcinogenic risk from exposure to a COPC is expressed in terms of the probability that an exposed receptor will develop cancer over their lifetime. Contaminant-specific dose response curves are used to establish slope factors (SFs) which represent an upper-bound excess cancer risk from a lifetime exposure. Dose response curves for human carcinogens are developed from tumorgenic and laboratory studies; the SF is generated from the 95 percent UCL of the extrapolated dose curve using probabilistic methods and represents a conservative upper-bound estimate of the potential risk associated with exposure. The SFs used in this risk assessment are summarized in Table A.5.

3.1.3 Lead Toxicity

Lead is classified as both a non-carcinogen and potential carcinogen; however, it is typically assessed as a non-carcinogen because those effects tend to occur at lower doses than those for carcinogenic effects. The most critical concern of exposure to lead is the potential for adverse neurological effects in young children.

Table A.4. Noncarcinogenic Toxicological Properties

COPC	Oral RfD (mg/kg-day)	Source	Critical Effect	Uncertainty Factor	Inhalation RfD (mg/kg-day)	Critical Effect	Uncertainty Factor
Arsenic	3.0E-04	IRIS	Hyperpigmentation, keratosis, and possible vascular complications	3	--	--	--
Lead	ND	ND	ND	ND	ND	ND	ND
Manganese	2.4E-02	IRIS	Central nervous system effects	3	--	--	--

Notes:
mg/kg-day = Milligram per kilogram per day
COPC = contaminant of potential concern; IRIS = Integrated Risk Information System (On-line database); ND =nNo data; RfD = reference dose

Table A.5. Carcinogenic Toxicological Properties

COPC	Oral SF $(mg/kg\text{-}day)^{-1}$	Source	Type of Cancer	Weight of Evidence	Inhalation SF $(mg/kg\text{-}day)^{-1}$	Source	Type of Cancer	Weight of Evidence
Arsenic	1.5E+00	IRIS	Skin	A	1.50E+01	IRIS	Lung	A

Notes:
mg/kg-day = Milligram per kilogram per day
A = known human carcinogen; COPC = contaminant of potential concern; IRIS = Integrated Risk Information System (On-line database); SF = slope factor

The EPA does not currently provide toxicological data for lead and RfDs and SFs have not been established for assessing hazard and risk from exposure to lead. However, the EPA has developed a model to assess lead exposures to children and they provide suggested screening levels to limit risks from exposure to lead in soils and other media. Also, the BLM has developed Risk Management Criteria (RMC) for metals, including lead, at mining sites based on estimated risks to typical receptors (BLM 1996).

4.0 RISK CHARACTERIZATION

Potential human health impacts associated with exposure to COPCs at the Ajax-Magnolia site were evaluated by estimating both non-carcinogenic and carcinogenic effects. The following sections discuss the assessment of non-carcinogenic hazards, carcinogenic risks, and lead risk associated with exposure to COPCs at the site.

4.1 Non-carcinogenic Hazard Assessment

Non-carcinogenic hazards were evaluated by comparing estimated chronic daily intakes (CDIs) to EPA-established RfD. The CDI represents the estimated daily exposure in milligrams per kilogram per day (mg/kg-day) to a contaminant at the site based on site-specific exposure factors and other parameters. RfDs are determined by the EPA and represent route-specific estimates of the safe dosage for each COPC over a lifetime of exposure. RfDs can be classified as chronic or subchronic depending on the length of exposure. Chronic RfDs were used in this risk assessment and represent the highest average daily exposure to a human receptor that will not cause adverse health effects during their lifetime.

CDIs were calculated for each pathway using the following equations:

Ingestion:	CDI = (CS)(IR)(EF)(ED)(CF)(1/BW)(1/AT)
Dermal Contact:	CDI = (CS)(SA)(SSAF)(DABS)(EF)(ED)(CF)(1/BW)(1/AT)
Inhalation:	CDI = (CS)(IN)(EF)(ED)(1/BW)(1/AT)(1/PEF)

Where:

CS = Contaminant concentration (milligram per kilogram [mg/kg] or milligram per liter [mg/L])

IR = Ingestion rate (milligram per day [mg/day])

EF = Exposure frequency (day per year)

ED = Exposure duration (year)

CF = Conversion factor (kg/mg or liter per cubic centimeter [L/cm^3])

BW = Body weight (kg)

AT = Averaging time (day)

SA = Skin surface area (square centimeters [cm^2])

SSAF = Soil to skin adherence factor (milligram per square centimeter per day [$mg/cm^2/day$])

IN = Inhalation rate (cubic meter per day [m^3/day])

PEF = Particulate emission factor (cubic meters per kilogram [m^3/kg])

Once the CDIs are calculated for all pathways, they are divided by the RfDs for each COPC to obtain a Hazard Quotient (HQ):

Noncarcinogenic Hazard Quotient = CDI/RfD

Where:

CDI = Chronic daily intake; the estimated exposure over a given time

RfD = Reference dose; the exposure level above which represents potential adverse health effects

The individual HQs for each COPC in an exposure pathway are then summed to determine a Hazard Index (HI). HQ or HI values greater than 1.E+00 indicate the potential for adverse health effects because the estimated intake exceeds the RfD.

4.2 Carcinogenic Risk Assessment

The carcinogenic risk from exposure to a COPC is expressed in terms of the probability that an exposed receptor will develop cancer over their lifetime. Carcinogenic risks are estimated by multiplying the CDIs averaged over a lifetime of exposure by COPC-specific SFs developed by the EPA:

Carcinogenic Risk = (CDI)(SF)

Where:

CDI = Chronic daily intake averaged over a lifetime; i.e., the estimated lifetime exposure at the site

SF = Slope factor; the upper-bound estimate of probability of cancer per unit of intake over a lifetime

The SF converts the contaminant intake to a risk of developing cancer from the exposure. SFs are chemical- and route-specific and represent an upper bound individual excess lifetime cancer risk.

The carcinogenic risk from each COPC in an exposure pathway is summed to determine the cumulative risk for each pathway and the cumulative risks from each pathway are summed to determine the overall site risk. According to ODEQ guidance, the acceptable excess cancer risk (ECR) from exposure to single and multiple carcinogens is less than or equal to 1.E-06 and 1.E-05, respectively.

4.3 Lead Risk Assessment

Risks from exposure to lead cannot be quantified using standard risk assessment algorithms because lead RfDs and SFs have not been established by the EPA. However, EPA has developed the Integrated

Exposure Uptake Biokinetic (IEUBK) model to assess lead exposures to children 7 years of age and less. The model does not assess lead intakes for older children or adults because younger children are the most sensitive receptors to the non-carcinogenic effects of inorganic lead. Because of the low probability of such a receptor being exposed to lead at the site, and because of the significant risks associated with arsenic levels, exposure to lead was not quantitatively evaluated in this HHRA. However, lead concentrations at the site were compared with EPA screening criteria and RMCs developed by the BLM to identify areas and media posing potential risks from exposure to lead at the Ajax-Magnolia site.

Lead was identified as a COPC in soils at the Ajax-Magnolia site because the results of one sample (1,210 mg/kg) exceeded the EPA Industrial Soil PRG of 800 mg/kg. Lead also was retained as a COPC in surface water because of the lack of EPA screening criteria for water.

5.0 UNCERTAINTY ANALYSIS

The estimates of exposure, noncarcinogenic hazard, and carcinogenic risk presented in this risk assessment are subject to varying degrees of uncertainty from a variety of sources, including site data, exposure assessment, and risk characterization.

5.1 Site Data

The size of the data set, sample locations, and sample analyses can all contribute uncertainty to the risk assessment. In general, smaller data sets lend more statistical variability to estimates of contaminant concentrations and may over or under estimate the true mean or maximum concentration. Because of the limited number of samples collected at the site, the MDCs were used to represent EPCs for the RME scenario which may have significantly over estimated true risks and hazards. Also, the development of background concentrations for all media was based on a single sampling location for each media and may differ significantly from actual site conditions.

The intent of the sampling was to determine metals concentrations in areas of suspected contamination, such as waste piles, adit drainage, and settling ponds. Exposure doses based on the results of these non-random samples likely do not represent average conditions for the site and may significantly over estimate the true, site-wide, average exposure concentrations.

The analytical suite was limited to metals; risks from exposure to organics at this site were not characterized in this risk assessment.

5.2 Exposure Assessment

Many of the factors used to estimate exposure rates at the site are based on standard risk assessment guidance values and may not be representative of actual site conditions or uses. The assumed receptors are limited to a recreationist and site worker. The recreational exposure frequencies are based on very limited use because of the site status, limited access, and absence of nearby developed recreational areas. If the site is opened to public access, the assumed recreational exposure durations may under estimate actual use. However, the assumed duration of 10 years may over estimate actual use since it is unlikely that a hunter or recreationist will revisit the site for 10 consecutive years.

The assumed worker exposure frequencies are based on limited maintenance activities and may under estimate actual use if active mining resumes. However, it is unlikely that any single individual worker will operate the site for 25 consecutive years.

Recreational activities associated with the site (hiking and hunting) do not generally result in dermal contact or ingestion of sediment. Inclusion of these exposure pathways likely contributes additional conservatism to the risk assessment.

It is inherently assumed that future COPC concentrations will remain the same as current concentrations. In general, this typically over estimates COPC concentrations and the resulting exposure intakes.

5.3 Toxicity Assessment

Uncertainties are inherent in toxicity factors because of several factors, including statistical extrapolation, population variability, and limited biological and epidemiological studies. These uncertainties may contribute to under or over estimation of potential risks and hazards.

5.4 Risk Characterization

The standard algorithms used to calculate the contaminant intakes and associated health risks and hazards add uncertainty to the risk assessment. The algorithms assume the additivity of toxic effects for multiple contaminants and do not account for synergistic or antagonistic effects. Concurrent exposure to multiple pathways by a single receptor and the associated cumulative risks and hazards also is assumed which likely over estimates actual exposures. The algorithms also do not account for factors such as absorption or matrix effects.

5.5 Lead Risk

Because of the lack of toxicological information for lead, potential health risks from exposure to lead at the site were not estimated. However, the potential risks were qualitatively evaluated by comparing lead concentrations in soil and surface water samples to suggested screening values and may or may not be representative of actual risks.

6.0 SUMMARY OF POTENTIAL RISKS

The estimated non-carcinogenic hazards and carcinogenic risks from exposure to COPCs at the Ajax-Magnolia site were compared with the ODEQ acceptable hazard level of 1 (HI $\leq$ 1.E+00) and acceptable ECR from exposure to a single carcinogen of one per one million (ECR $\leq$ 1.E-06). The acceptable risk level for a single carcinogen was used because, although lead may be considered a carcinogen, arsenic was the only carcinogenic COPC for which risk levels were quantified. In accordance with ODEQ guidance, the estimated non-carcinogenic hazards and carcinogenic risks were rounded to one significant digit (ODEQ 2000).

Results indicate noncarcinogenic hazards to the child recreationist, and significant carcinogenic risks to all receptors, primarily from ingestion of and dermal exposure to arsenic. Risks associated with inhalation of soil particulates were below acceptable levels for all receptors; therefore, inhalation is considered an insignificant exposure pathway. Similarly, RME cancer risks associated with dermal exposure to surface water only marginally exceeded acceptable levels for the adult recreationist and worker (ECR = 2.E-06

for both receptors); therefore, this exposure pathway is considered insignificant. Nearly all of the estimated non-carcinogenic hazards result from exposure to arsenic. Although manganese contributes to the cumulative hazards, individual HIs from exposure to manganese under both scenarios were all less than 0.05. Therefore, manganese contributes only negligible hazard and is not considered a significant human health contaminant at the site.

The estimated non-carcinogenic hazards and carcinogenic risks from exposure to COPCs at the Ajax Magnolia site are discussed in the following sections and summarized in Table A.6.

Table A.6. Human Health Hazard and Cancer Risk Summary

Receptor	Media			TOTAL	Acceptable Level[a]
	Soil	Sediment	Surface Water		
	RME Hazard Quotient				
Adult Recreationist	3.E-02	2.E-02	5.E-02	1.E-01	1.E+00
Child Recreationist	**2.E+00**	8.E-01	5.E-01	**4.E+00**	1.E+00
Adult Worker	9.E-01	1.E-01	3.E-01	1.E+00	1.E+00
	CTE Hazard Quotient				
Adult Recreationist	7.E-03	4.E-03	1.E-02	2.E-02	1.E+00
Child Recreationist	8.E-02	4.E-02	3.E-02	1.E-01	1.E+00
Adult Worker	2.E-02	6.E-03	1.E-02	4.E-02	1.E+00
	RME Cancer Risk				
Adult Recreationist	**6.E-06**	**4.E-06**	**1.E-05**	**2.E-05**	1.E-06
Child Recreationist	**9.E-05**	**3.E-05**	**2.E-05**	**1.E-04**	1.E-06
Adult Worker	**2.E-04**	**2.E-05**	**5.E-05**	**2.E-04**	1.E-06
	CTE Cancer Risk				
Adult Recreationist	4.E-07	2.E-07	6.E-07	1.E-06	1.E-06
Child Recreationist	**3.E-06**	**2.E-06**	1.E-06	**6.E-06**	1.E-06
Adult Worker	1.E-06	3.E-07	7.E-07	**2.E-06**	1.E-06

Notes:
Bolded values exceed allowable levels
CTE = central tendency exposure; RME = reasonable maximum exposure
[a]ODEQ 2000

6.1 Non-carcinogenic Hazards

Under the CTE scenario, the cumulative non-carcinogenic hazards were below the acceptable level for all receptors and all exposure pathways. However, under the RME scenario, the cumulative non-carcinogenic hazards exceeded the acceptable level for the child recreationist. The primary exposure pathways are dermal contact and ingestion of soil. HIs for inhalation of soil and sediment particulates are below the acceptable level for all receptors under the RME scenario. Also, HIs from exposure to surface water and sediment were below the acceptable level for all receptors. Therefore, inhalation of particulates and exposure to surface water and sediment at the site do not pose significant non-carcinogenic hazards to receptors.

The estimated non-carcinogenic hazards resulting from exposure to manganese were all less than 0.05 for both the CTE and RME scenarios. Although manganese contributes to the overall cumulative hazard, the majority of hazard results from exposure to arsenic. Therefore, manganese is not considered a significant human health contaminant at the site.

6.2 Carcinogenic Risks

The results indicate marginal carcinogenic risks to the adult worker (ECR = 2.E-06) and child recreationist (ECR = 6.E-06) under the CTE scenario, and significant carcinogenic risks to all receptors under the RME scenario (ECRs = 2.E-05 to 2.E-04). The primary exposure pathway is ingestion of arsenic in soil, sediment, and surface water.

Carcinogenic risks associated with inhalation of soil particulates were below the acceptable level for all receptors under both the CTE and RME scenarios. Also, carcinogenic risks from dermal exposure to surface water only marginally exceeded the acceptable level for the worker (ECR = 2.E-06). Therefore, inhalation of particulates and dermal exposure to surface water at the site do not pose significant carcinogenic risks to receptors.

6.3 Lead Risks

The EPA has not specified a hazardous waste threshold value for total lead in soil and they have not established a drinking water maximum contaminant level (MCL) for lead; however, they suggest lead screening levels of 400 mg/kg for residential soils and 15 µg/L for drinking water. All surface water results were well below the suggested 15 µg/L drinking water screening level. Two soil samples exceeded the 400 mg/kg residential soil screening level and only one sample exceeded the BLM RMC of 1,000 mg/kg lead in soils for a camper receptor (BLM 1996). Therefore, there appears to be only isolated risks from exposure to lead in soils at the site.

7.0 REFERENCES

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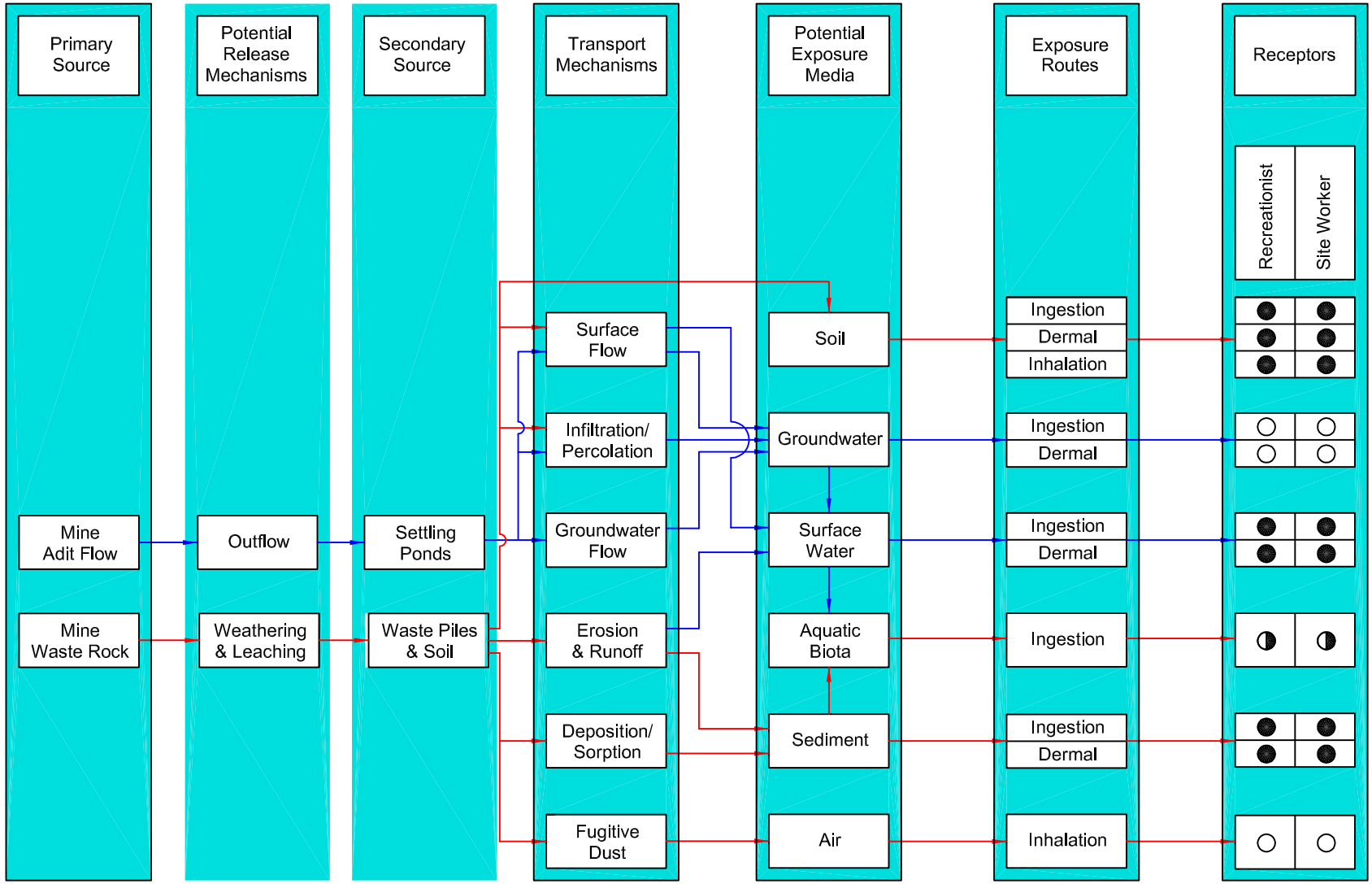

Legend

- ● Complete and potentially significant exposure pathway
- ◑ Potentially complete but insignificant exposure pathway
- ○ Incomplete exposure pathway

MSE Millenium Science and Engineering, Inc.
1605 North 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292

Human Health Conceptual Site Model

B2473A	11-15-04	HH CSM.dwg	FIGURE A.1

APPENDIX B

STREAMLINED
ECOLOGICAL RISK ASSESSMENT

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1.0 INTRODUCTION

This report presents the Screening Level Ecological Risk Assessment (ERA) that was prepared as part of the Engineering Evaluation/Cost Analysis (EE/CA) for the Ajax and Magnolia Mines ("the site") in Grant County, Oregon. This ERA was completed in substantial conformance with the Oregon Department of Environmental Quality (ODEQ)*"Guidance for Ecological Risk Assessment"* (1998 and 2001), and Oregon Administrative Rule (OAR) 340-122-084.

The objective of this ERA is to evaluate the potential for ecological risks due to mine-related contamination. Results of this ERA will be used to guide remedial action selection at the site. A detailed description of the site location, background, previous site investigations, and physiography is included in the main body of the EE/CA and will not be reiterated in this report.

This report is organized as follows:

- **Section 2** – Level 1 Scoping ERA
- **Section 3** – Level 2 Screening ERA
- **Section 4** – Conclusions
- **Section 5** – References

2.0 LEVEL 1 SCOPING ECOLOGICAL RISK ASSESSMENT

The objective of the Level 1 ERA is to qualitatively determine whether there is any potential of ecological receptors or exposure pathways at the site. It requires an examination of the ecological setting of the site, presence of sensitive environments, presence of threatened or endangered (T&E) species, ecological stressors (contaminants of interest [COI]), and development of a conceptual site exposure model (CSEM). Each of these components is discussed in the following sections.

2.1 Ecological Setting

The site is located in the Umatilla National Forest and within the Level III Blue Mountain Ecoregion. Terrestrial habitats in vicinity of the site include steep woodland hillsides, meadows, riparian zones, and wetland areas. According to information provided in the Site Inspection (SI) report (EA Engineering, Science, and Technology, Inc. [EA] 2004), the dominant vegetation types on the hillsides are douglas fir (*Pseudotsuga menziesii*) and lodgepole pine (*Pinus contorta*). The hillsides were characterized by a fairly dense overstory with large numbers of deadfall and a sparse understory. The understory vegetation consist of grasses, forbs, and whortleberry (*Vaccinium scoparium*). The riparian zone overstory is dominated by alder (*Alnus rubra*) and dogwood (*Cornus stolonifera*). The understory consist primarily of grasses, sedges, and *Equisetum* species.

A detailed description of the hydrologic setting of the site is presented in the EE/CA. In summary, the site is adjacent to Lucas Gulch, which flows into Granite Creek, a tributary to the North Fork John Day River. Lucas Gulch is a first order stream, which is capable of supporting macroinvertebrate communities and fish.

An ODEQ ecological scoping checklist was completed by Millennium Science and Engineering, Inc. (MSE) during the site visit conducted on September 21-22, 2004 and is included in Attachment A.

2.2 Sensitive Environments

According to OAR 340-122-045, a sensitive environment is *"an area of particular environmental value where a hazardous substance could pose a greater threat than in other non-sensitive areas. Sensitive environments include but are not limited to: critical habitat for federally endangered or threatened species; National Park, Monument, National Marine Sanctuary, National Recreational Area, National WildlifeRefuge, National Forest Campgrounds, recreational areas, game management areas, wildlife management areas; designated federal Wilderness Areas; wetlands (freshwater, estuarine, or coastal); wild and scenic rivers; state parks; state wildlife refuges; habitat designated for state endangered species; fishery resources; state designated natural areas; county or municipal parks; and other significant open spaces and natural resources protected under Goal 5 of Oregon's Statewide Planning Goals."*

Based on this definition, sensitive environments within the locality of the site include:

- Jurisdictional wetlands identified in the wetlands assessment conducted as part of the SI (EA 2004); and
- Lucas Gulch and Granite Creek because of their spawning, rearing, and migratory pathway characteristics for federally-listed species (bull trout and steelhead).

2.3 Threatened and Endangered Species

A list of T&E and species of concern (SOC) wildlife and plant species potentially occurring in Grant County was obtained from the Oregon Natural Heritage Program (ORNHP 2001) and the U.S. Forest Service (USFS), North Fork John Day Ranger District (2001). Results are presented in Attachment B, Tables B1 (wildlife) and B2 (plants). In addition, the Oregon Natural Heritage Information Center (ONHIC) was contacted regarding records of rare and T&E species occurrences within a 2-mile radius of the site. Results from the ONHIC indicate the following species have been documented within a 2-mile radius of the site:

<u>Federal Species Listed as Threatened:</u>

- *Oncorhynchus mykiss* (Steelhead – Middle Columbia River ESU, summer run)
- *Salvelinus confluentus* (Bull Trout – Columbia River population)

<u>Federal Species Listed as Candidate:</u>

- *Rana luteiventris* (Columbia spotted frog)

No terrestrial or aquatic T&E or rare species were observed during the site visit conducted by MSE on September 21-22, 2004. Similarly, no T&E species were reportedly observed during SI site visits; however, redband trout (*Oncorhynchus mykiss*), a federal SOC, was documented in Lucas Gulch during SI activities (EA 2004). For the purposes of this ERA, the federally listed species that will be evaluated are the steelhead and bull trout, both of which are listed as threatened.

2.4 Contaminants of Interest

The SI report identified the following potential COIs at the site: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium (VI), chromium (III), cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, zinc, and cyanide (EA 2004). Many of these COIs are present in the soil, waste rock piles, surface water (including adit drainage), sediment, and pore water. The risk posed by these COIs to ecological receptors will be examined further in the Level 2 Screening ERA, discussed in Section 3.0 of this report. A summary of the data collected in each media as part of the SI and EE/CA is provided in the EE/CA report.

2.5 Conceptual Site Exposure Model

A CSEM illustrates the general understanding of the sources of contamination, release and transport mechanisms, impacted exposure media, potential exposure routes, and ecological receptors at the site. At this site, the primary sources of COIs include adit discharge and waste rock piles. Precipitation could lead to the following release/transport mechanisms from the waste rock piles: runoff, leaching, percolation, or infiltration into surface or subsurface soils, groundwater, or surface water. COIs in the adit discharge can follow a similar fate as COIs in the waste rock piles. Once in the groundwater, COIs can be transported to surface water, where they can be deposited to sediment or transported downstream as a dissolved constituent or attached to suspended sediment.

Based on current knowledge of the site, potential exposure media at the site includes surface water in streams, ponds, and adit discharge; waste rock piles and surface soils; and sediment in Lucas Gulch, settling ponds, and channels carrying adit discharges.

Ecologic receptors include terrestrial wildlife (plants, birds, invertebrates, reptiles and amphibians, and mammals) and aquatic biota (invertebrates and fish). There are no federally listed T&E terrestrial receptors at the site. There are two federally-listed species of fish (bull trout and steelhead) that may exist near the site.

Figure B.1 illustrates the CSEM and includes complete as well as incomplete or insignificant exposure routes.

3.0 LEVEL 2 SCREENING ECOLOGICAL RISK ASSESSMENT

A Level 2 Screening ERA was conducted at the site in accordance with ODEQ guidance (2001). The purpose of the Level 2 assessment is to evaluate the data collected in previous investigations and select those contaminants and media that pose potential risks to ecological receptors. The Level 2 assessment consists of:

- Reviewing the exposure pathways and receptors present on the site;
- Identifying assessment and measurement endpoints;
- Identifying exposure point concentrations for use in the ecological risk screening; and
- Identifying contaminants of potential ecological concern (CPECs).

3.1 Exposure Pathway and Receptor Summary

The exposure pathways to be qualitatively and quantitatively addressed are illustrated in the CSEM (Figure 1) and discussed in this risk assessment. In summary, the exposure pathways addressed in this ERA include:

- Incidental ingestion of soil and sediment;
- Direct contact with soil, sediment, surface water, and pore water; and
- Ingestion of surface water.

3.2 Ecological Endpoints

Identification of ecological endpoints guides the completion of the risk characterization portion of the ERA. Assessment and measurement endpoints for this ERA were developed based on the CSEM for the site and are discussed in the following sections.

3.2.1 Assessment Endpoints

According to OAR 340-122-115(7), an assessment endpoint is an "explicit expression of a specific ecological receptor and an associated function or quality that is to be maintained or protected." The assessment endpoints for this ERA include:

- Survival and reproductive success of non-protected terrestrial receptors (invertebrates, birds, mammals, and vegetation);
- Survival and reproductive success of non-protected aquatic life (invertebrates and fish); and
- Survival and reproductive success of protected aquatic life (bull trout and steelhead).

3.2.2 Measurement Endpoints

According to OAR 340-122-115(36), a measurement endpoint is a "quantitative expression of an observed or measured response in ecological receptors exposed to hazardous substances." Typically, measurement endpoints will dictate the type of samples and/or data to be collected and assessed to address the impact of stressors on the ecological receptors. The measurement endpoint for this ERA includes:

- Comparison of the measured concentrations of the COIs in soil, waste rock piles, surface water, and sediment to their respective ecological risk-based screening level values (SLVs)

3.3 Risk Assessment Data

3.3.1 Exposure Point Concentrations

Ecological receptors do not experience their environment on a "point" basis; therefore, it is necessary to convert measured data from single sample points into an estimate of concentration over their habitat to conduct an appropriate risk screening. For this assessment, the COI exposure point concentrations (EPCs)

were calculated in accordance with the ODEQ guidance (2001) when sufficient data existed. Depending on the ecological receptor, the EPC can either be the maximum detected concentration (MDC) or the 90 percent upper confidence limit (UCL_{90}). The UCL_{90} was calculated according to the methodology outlined in the ODEQ's Deterministic Human Health Risk Assessment Guidance (ODEQ 2000).

Because of the limited data set for this site (fewer than 10 samples for most media), EPCs in surface water, pore water, and sediment were the MDC reported in the SI (EA 2004). Additional soil samples were collected as part of the EE/CA, resulting in a sample set of greater than 10. Therefore, EPCs in soil were selected as being either the MDC or the EPC, depending on the ecological receptor as outlined below.

- For invertebrates (such as worms) and plants, the MDC soil concentration was used as the EPC
- For birds and mammals, the UCL_{90} was used as the EPC

3.4 Preliminary Screening of Contaminants of Interest

Prior to conducting an ecological risk-based screening, COIs were first subjected to preliminary screening. The preliminary screening consists of removing COIs from further analysis if they exhibit the following characteristics:

- Qualify as an essential nutrient;
- Detected in fewer than 5 percent of the samples; or
- Present in concentrations below the background concentration.

The preliminary screening results are summarized in the following sections and are presented in tabular format in Attachment C (Tables C1-C4).

3.4.1 Essential Nutrients Screening

Four of the COIs were determined to be essential nutrients: calcium, magnesium, potassium, and sodium. These COIs were removed from further analysis. Iron is also an essential nutrient.

3.4.2 Frequency of Detection Screening

This preliminary screen was performed separately for each exposure medium and is summarized in Table B.1.

3.4.3 Background Concentrations Screening

This preliminary screening also was performed separately for each exposure medium and is summarized in Table B.2.

Table B.1. Frequency of Detection Screening Results

Media	Frequency of Detection
Soil	All COIs were detected in more than 5% of the samples; therefore, all were retained for additional analysis.
Surface Water	**Beryllium**, **cadmium**, **silver**, and **cyanide (total)** were not detected in more than 5% of the samples; therefore, they were removed from further analysis.
Sediment	All COIs were detected in more than 5% of the samples; therefore, all were retained for additional analysis.
Pore Water	**Antimony, beryllium, cadmium, chromium (total), cobalt, copper, cyanide (total), lead, nickel, selenium, silver, thallium, and vanadium** were not detected in more than 5% of the samples; therefore, they were removed from further analysis.

Table B.2. Background Screening Results

Media	Frequency of Detection
Soil	**Aluminum** was detected at maximum concentrations less than background concentrations; therefore, it was removed from further analysis.
Surface Water	**Chromium (VI)** and **selenium** were detected at maximum concentrations below background concentrations; therefore, they were removed from further analysis.
Sediment	**Barium** was detected at maximum concentrations below background concentrations; therefore, it was removed from further analysis.
Pore Water	**Aluminum** and **chromium (VI)** were detected at maximum concentrations below background concentrations; therefore, they were removed from further analysis.

3.5 Chemistry-toxicity Screening

This task of the ERA requires comparing the EPCs to ecological risk-based SLVs. Typically, SLVs are obtained from ODEQ guidance document (2001); however, there were some instances where SLVs were not available in the document. In such instances, SLVs were obtained from other sources (if available) or substituted from a surrogate chemical when appropriate. SLVs for the exposure media are summarized in Attachment C, Tables C5-C8.

A chemistry-toxicity screen was performed based on the following conditions:

- Exposure to a single COI in an exposure medium;
- Exposure to multiple COIs in an exposure medium; and
- Exposure to individual COIs in multiple exposure media.

Potential ecological risk from exposure to a single COI in an exposure medium was assessed by calculating chemical-specific risk ratios (T_{ij}). Risk ratios for each COI are calculated by dividing the EPC by the SLV. The risk ratio is then compared to a "Q-factor" which is a receptor designator. According to the ODEQ guidance (2001), a Q-factor for "protected" species (federally listed as T&E) is 1, whereas a Q-factor for "non-protected" species (SOC or non-listed species) is 5. Given there are no listed T&E invertebrates, birds, mammals, or plants present at the site, the risk ratios were compared with a Q-factor of 5 for these receptor groups. Q-factors of 5 and 1 were used to evaluate risk to aquatic life since there is the potential for presence of listed fish species at the site. If the risk ratio was greater than the selected Q-factor, the chemical was retained as a CPEC. In general, higher risk ratios present a greater likelihood that a CPEC concentration will adversely affect ecological receptors.

Potential ecological risk from exposure to multiple COIs in an exposure medium was assessed by calculating the ratio of a chemical-specific risk ratio to the overall risk (sum of all chemical-specific risk ratios) presented in a medium. Again, if this ratio for a particular COI contributed an inordinate amount to the overall risk, it was retained as a CPEC.

Potential ecological risk from exposure to a COI in multiple exposure media was assessed by comparing the total risk posed by a COI in multiple media with the assigned Q-factor. If the total risk was greater, then the COI was retained as a CPEC.

The results of the chemistry-toxicity screen are presented in tabular format (Tables D5-D8) in Attachment C and are summarized in the sections below according to exposure media.

3.5.1 Soil Chemistry-Toxicity Screening Results

Attachment C (Table C5) presents the chemistry-toxicity screen calculations and results for the soil/waste pile samples. The CPECs identified based on the single COI and multiple COI chemistry-toxicity screens are summarized in Tables B.3 and B.4 below.

Table B.3. Identified Soil CPECs by Single COI Chemical-Toxicity Screening

CPEC	Plant	Invertebrate	Bird	Mammal
Antimony	X			
Arsenic	X	X	X	X
$Chromium_t$	X	X	X	
Cobalt	X			
Copper		X		
Iron	X	X		
Lead	X		X	
Manganese	X	X		
Mercury	X	X	X	
Nickel	X			
Selenium	X			
Silver	X			
Thallium	X			X
Vanadium	X			
Zinc	X	X	X	

Notes:
CPEC = contaminant of potential ecological concern

Table B.4. Identified Soil CPECs by Multiple COI Chemical-Toxicity Screening

CPEC	Plant	Invertebrate	Bird	Mammal
Arsenic			X	X
Iron	X	X		

Notes:
CPEC = contaminant of potential ecological concern

In summary, arsenic, chromium (total), iron, lead, manganese, mercury, thallium, and zinc are identified CPECs for multiple receptor groups.

3.5.2 Surface Water Chemistry-Toxicity Screening Results

For the surface water data, SLVs are generally based on the dissolved state of a metal in the water column, with the exception of aluminum and mercury. Thus, EPCs used in this ERA were set to be the maximum reported dissolved concentrations of metals in the water column, with the exception of aluminum. For aluminum, the maximum detected total concentration was used as the EPC. Reported concentrations of mercury were unusual in that the dissolved concentration was generally greater than the total concentration. Thus, the maximum reported dissolved concentration for mercury was selected as the EPC because it was a more conservative representation of water quality conditions. In addition, the SLVs for chemicals whose concentrations are hardness-dependent were adjusted for actual hardness of the water (copper, lead, nickel, and zinc).

Attachment C (Table C6) presents the chemistry-toxicity screen calculations and results for the surface water samples. The CPECs identified based on the single COI screen and the multiple COI screen are summarized in Tables B.5 and B.6 below.

Table B.5. Identified Surface Water CPECs by Single COI Chemical-Toxicity Screen

CPEC	Aquatic Life (P)	Aquatic Life (NP)
Aluminum	X	X
Barium	X	X
Iron	X	X
Manganese	X	X

Notes:
CPEC = contaminant of potential ecological concern; NP = non-protected; P = protected

Table B.6. Identified Surface Water CPECs by Multiple COI Chemical-Toxicity Screen

CPEC	Multiple COIs	
	Aquatic Life (P)	Aquatic Life (NP)
Aluminum	X	
Barium	X	X
Iron	X	
Manganese	X	

Notes:
COI = contaminant of interest; CPEC = contaminant of potential ecological concern; NP = non-protected; P = protected

The single COI risk ratios for avian and mammalian receptors did not exceed a Q-factor of 5; therefore, metal concentrations in the surface water do not appear to pose an unacceptable risk to these receptor groups. As a result, the avian and mammalian receptor groups are not included in Tables B.5 and B.6.

3.5.3 Sediment Ecological Chemistry-Toxicity Screening Results

As directed by ODEQ (2002), the MDC in sediment was compared to aquatic life freshwater sediment SLVs and aquatic life bioaccumulation SLVs, without the use of a Q-factor. Metals were identified as CPECs if the MDC was greater than the respective SLV. Attachment C (Table C7) presents the chemistry-toxicity screen calculations and results for the sediment samples. Table B.7 summarizes the identified sediment CPECs.

Table B.7. Identified Sediment CPECs by Chemical-Toxicity Screen

CPEC	Freshwater Sediment	Bioaccumulation
Antimony	X	X
Arsenic	X	X
Cadmium	X	X
$Chromium_t$	X	
Copper	X	X
Lead	X	
Manganese	X	
Mercury	X	
Nickel	X	X
Selenium		X
Thallium		X
Zinc	X	X

Notes:
CPEC = contaminant of potential ecological concern

3.5.4 Pore Water Ecological Chemistry-Toxicity Screening Results

The EPCs for pore water are the maximum reported dissolved concentrations of metals because that was the only available data. The exceptions to this include arsenic(III) and arsenic(V), which were reported as total concentrations.

Attchment D (Table D8) presents the chemistry-toxicity screen calculations and results for the pore water samples. The only identified CPEC for aquatic life was barium (risk ratio of 21).

3.6 Bioaccumulation Screen

According to OAR 340-122-084(3)(d), special attention must be given to COIs that are, or are suspected of being, persistent bioaccumulative toxins. In the suite of COIs identified for this ERA, metals with the most bioaccumulative potential include cadmium, mercury, selenium, silver, and zinc.

3.7 SLV Availability Screen

In some instances, SLVs were not available for a given COI-media-receptor combination. Although estimating the toxicity or bioaccumulative potential of the COI was not possible, the COI was not removed from further consideration. Table B.8 provides a summary of the COI-media-receptor combinations that do not have available SLVs.

3.8 Risk Characterization

Risk characterization is comprised of describing the risks to ecological receptors and the uncertainties in the ERA. The objective of the risk description is to assess whether the predicted risks are likely to occur at the site. The objective of the uncertainties analysis is to examine the data gaps or sources of variability in the ERA process and whether these uncertainties under estimate or over estimate the ecological risks at the site. The uncertainty evaluation is described in Section 3.9 of this report.

3.8.1 Surface Soil/Waste Pile

Eighteen CPECs were identified for soil: antimony, arsenic, cadmium, chromium (VI), chromium (total), cobalt, copper, cyanide, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc. Of these, arsenic can be considered the most significant CPEC because it poses a potential threat to all ecologic receptors.

Vegetation was the ecological group most susceptible to risk from the identified CPECs. The risk screening identified 14 metals (Table B.3) that exceeded the corresponding plant SLVs and 2 metals for which no plant SLV was available (chromium [VI] and cyanide). In addition, cadmium was recognized as a CPEC because of its bioaccumulative potential; however, cadmium was detected at only three sample locations; therefore, it was removed from consideration as a CPEC. Risk ratios for CPECs that exceeded plant SLVs ranged from 11.6 mg/kg (selenium) to 13,900 mg/kg (iron). The risk ratios were calculated using the MDC (since plants are subject to constant exposure); however, the second highest detected concentration for four CPECs (cobalt, nickel, selenium, and thallium) did not present a significant threat to non-protected plants. Although there may be some specific areas at the site that present a risk to vegetation from these four metals, site-wide risks are not expected.

Table B.8. Availability of SLVs Screening Results

COI	Plants	Inverts	Birds	Mammals	Aquatic Life	Bioaccumulation
Soil						
Antimony		X	X			
Chromium (VI)	X	X	X			
Cobalt			X			
Cyanide	X	X	X	X		
Iron			X	X		
Silver			X	X		
Thallium		X	X			
Vanadium		X				
Surface/Pore Water						
Antimony			X			
Chromium (VI)			X			
Cobalt			X			
Iron			X	X		
Thallium			X			
Sediment						
Aluminum					X	X
Beryllium					X	
Cobalt					X	X
Cyanide					X	X
Iron					X	X
Manganese						X
Mercury						X
Selenium					X	
Silver						X
Thallium					X	
Vanadium					X	X

Notes:
A total of 39 COI-media-receptor combinations were not assessed because of a lack of data.
X = SLV not available; COI = contaminant of interest; SLV = screening level value

Invertebrates were susceptible to risks from the following CPECs: arsenic, chromium (total), copper, iron, manganese, mercury, and zinc. An additional five metals (Table B.8) were identified as CPECs because of their lack of assigned SLVs. Of the seven CPECs with SLVs, the risk ratios for copper and zinc were slightly above the Q-factor of 5; therefore, copper and zinc are not likely realistic CPECs for invertebrates. Furthermore, the maximum reported concentrations (used for calculation of the risk ratio) for copper and zinc occurred at a single location on the site and were at least double of the reported concentrations at other locations. Overall, given the elevated risk ratios, there is potential risk to invertebrate populations on the site from arsenic, chromium (total), iron, manganese and mercury. Additional CPECs identified as a result of their bioaccumulation potential include silver and zinc.

Five metals had risk ratios greater than the SLVs for avian receptors including arsenic, chromium (total), lead, mercury, and zinc. Of these, the risk ratio for chromium (total) (6.65) was only slightly above the Q-factor of 5; therefore, it is not likely a good candidate for retaining as a CPEC. Similarly, mercury and zinc had relatively low risk ratios (5.3 and 8.1); however, since they have the potential for bioaccumulation, they should be retained as CPECs. In addition, seven metals were identified as CPECs because of their lack of assigned SLVs (Table B.8). Overall, given the elevated risk ratios for arsenic and lead and the bioaccumulation potential of mercury, there is potential risk to avian receptors from exposure to these three metals on the site. Additional CPECs identified as a result of their bioaccumulation potential include silver, selenium, and zinc.

The risk screening identified two metals (arsenic and thallium) that exceeded the corresponding mammalian SLV and three metals (cyanide, iron, and silver) for which no mammalian SLVs were available. Given its relatively low risk ratio (7.1), thallium is not likely to pose a significant risk to mammalian receptors. Furthermore, detected concentrations of thallium sufficient to pose a potential risk to mammalian receptors occurred at only one location on the site. Given its localized presence, it may be prudent to remove thallium from the list of CPECs. Arsenic had a relatively high risk ratio (86.9) and was present in elevated concentrations throughout the site; therefore, there is potential risk to mammalian receptors from exposure to arsenic on the site. Additional CPECs identified as a result of their bioaccumulation potential include mercury, silver, selenium, and zinc.

3.8.2 Surface Water

Thirteen CPECs were identified in surface water: aluminum, antimony, barium, cadmium, chromium (total), cobalt, iron, manganese, mercury, selenium, silver, thallium, and zinc. Of these, aluminum, barium, iron, and manganese had unacceptable risk ratios to aquatic life.

Risk posed to aquatic life from exposure to aluminum concentrations appears to be limited to the adit discharges rather than in Lucas Gulch. Protected aquatic life (steelhead and bull trout) are not likely to utilize the adit drainage channel; therefore, risk to these receptors is unlikely. Similarly, risk posed to aquatic receptors from iron and manganese appears to be limited to adit discharge and the wetland area between the Ajax waste pile (WP-11) and Lucas Gulch. Barium appears to pose a risk to aquatic life in Lucas Gulch as well as the adit drainage; however, barium concentrations in the background sample of Lucas Gulch also presented a risk to aquatic life. Given the elevated background concentrations, it may be prudent to remove barium from the CPEC list.

Although silver and cyanide were not detected in any of the surface water samples, they should be retained as a CPECs because: (1) the method detection limits (MDLs) for silver (2.2 μg/L) and cyanide

(10 µg/L) were greater than their respective SLVs (0.12 µg/L and 10 µg/l, respectively); and (2) silver is generally known to be a bioaccumulator. Additional CPECs identified as a result of their bioaccumulation potential and presence in the surface water include mercury, selenium, and zinc.

Risk ratios for avian and mammalian receptors were less than 5 (Q-factor). As a result, there is no evident risk to these receptors from ingestion of surface water (including adit discharge). However, five metals were identified as CPECs because of their lack of SLVs for birds (antimony, chromium [VI], cobalt, iron, and thallium) and mammals (iron).

3.8.3 Sediment

Nineteen CPECs were identified in sediment based on:

- Exceeding the freshwater sediment SLV (antimony, arsenic, cadmium, chromium (total), copper, lead, manganese, mercury, nickel, and zinc);
- Exceeding the bioaccumulation SLV (antimony, arsenic, cadmium, copper, nickel, selenium, thallium, and zinc);
- Lacking SLVs for freshwater sediment (aluminum, beryllium, cobalt, cyanide, iron, selenium, thallium, and vanadium);
- Lacking SLVs for bioaccumulation (aluminum, cobalt, cyanide, iron, manganese, mercury, silver, and vanadium; or
- Potential for bioaccumulation (cadmium, mercury, selenium, silver, and zinc).

This data suggests that sediment might be a potential risk to ecological receptors in the aquatic environment. Although the MDCs for many of the metals were detected in locations outside of Lucas Gulch, concentrations of metals in the sediments of Lucas Gulch also exceeded the SLVs. However, the sediment and bioaccumulation risk ratios for antimony, chromium (total), copper, lead, manganese, and thallium were less than 10 (when using the maximum recorded concentration in Lucas Gulch), which indicates a fairly low level of risk. The lack of historical macroinvertebrate community data at the site does not allow for a pre- and post-mine evaluation. Furthermore, lack of macroinvertebrate or fish tissue analysis precludes assessing bioaccumulation of metals in the food chain. Overall, the primary CPECs in the sediment of Lucas Gulch include: arsenic, cadmium, mercury, nickel, selenium, silver, and zinc.

3.8.4 Pore Water

One metal (barium) was identified as a CPEC in pore water. No CPECs were identified as a result of missing SLVs. CPECs identified because of their bioaccumulative potential include mercury, selenium, cadmium, silver, and zinc.

The pore water ecological receptors are limited to aquatic macroinvertebrates; therefore, a Q-factor of 5 was used to select CPECs. Although identified as a CPEC, barium concentrations in samples collected near the mine were similar to concentrations observed at the background sample station (upstream of Magnolia). This indicates that although the mines are contributing to some of the elevated risks to aquatic life from barium exposure, treatment of barium sources at the mine (waste rock piles and adit discharge) will not eliminate the risk to aquatic receptors. Given the elevated background concentration, barium was removed from the list of CPECs. Silver was not detected in any of the pore water samples; however, the

MDL for silver was not low enough to assess impacts to ecological receptors. Cadmium and selenium were not detected in any of the pore water samples; therefore, they can be removed from the list of CPECs. As a result, the primary CPECs are mercury, silver, and zinc.

3.9 Uncertainty Evaluation

There are several sources of uncertainty associated with this ERA. These sources and their potential impact on the prediction for potential risks to ecological receptors at the site are discussed below.

3.9.1 Sample Data

The selection of sampling media, sample locations, quantity of samples, sampling procedures, and sample analysis introduce some uncertainties into this ERA. For example, time and monetary restraints limit the number of samples that can be collected; therefore, sample locations are selected based on knowledge of anticipated presence of particular chemicals. Overall, the data used in this risk assessment were generally collected from areas with expected elevated metals concentrations. As a result, this assessment likely over estimates the risk posed to ecologic receptors across the site. In addition, soil and waste rock data was collected by separate entities on separate occasions, and analyzed by separate laboratories, yet the data were grouped together for calculation of UCL_{90}.

Laboratory analysis also introduces some uncertainties into this ERA. For example, some chemical concentrations used to calculate the risk ratio were reported between the MDL and the practical quantitation limit (PQL). This may lead to over or under estimation of the overall ecological risk from exposure to these chemicals. In addition, some previously reported dissolved concentrations were greater than the reported total concentrations. In these instances, the dissolved concentrations were used and compared against the SLVs (even if the SLVs were based on total concentrations).

Data gaps were another source of uncertainty in the ERA. The lack of SLVs resulted in retaining 39 receptor-media-COI combinations as CPECs. This may lead to an over estimation of the overall potential for ecological risk at the site. In addition, the inadequate MDL for silver prohibited assessment of any potential ecological risk because of silver bioavailability and bioaccumulation. The lack of methyl-mercury data prevented assessing the risk posed to ecological receptors from this constituent. The use of the inorganic mercury data and SLVs may result in an under estimation of the risk posed to ecological receptors from mercury contamination.

3.9.2 Screening Level Values

The ecological risk-based SLVs used in this ERA are intended to be no-observed-adverse-effects-levels (NOAELs), with the exception of sediment SLVs. Ecological effects occur at some concentration between the NOAELs and the lowest-observed-adverse-effects-levels (LOAELs); therefore, concentrations exceeding the SLV do not necessarily constitute a "real" risk for ecological receptors. Thus, use of NOAEL-based SLVs results in an over estimation of actual ecological risks at the site.

3.9.3 CPEC Selection

Only one background sample was used for determining whether concentrations were elevated above background concentrations. Concentrations of chemicals are naturally variable; therefore, a single sample

does not accurately reflect "natural" conditions. Furthermore, it is arguable whether the background sample was collected at a location that has not been impacted by mining activities. As a result, improper inclusion of chemicals during the background screening may result in over estimating actual risks, and improper exclusion of chemicals may result in under estimating actual risks.

Use of MDCs or UCL_{90} inherently introduces conservatism and contributes to over estimation of risk at the site.

4.0 CONCLUSIONS

Plants were the most susceptible ecological group to metal concentrations in the soil and waste rock piles (11 CPECs identified). The primary CPECs for the soil-plant combination exhibit elevated concentrations across the entire site or have the potential to bioaccumulate and include: arsenic, chromium (total), iron, mercury, selenium, silver, vanadium, and zinc. Similarly, the primary CPECs for terrestrial invertebrates are arsenic, chromium, iron, manganese, mercury, selenium, silver, and zinc. The primary CPECs posing a risk to birds and mammals from exposure to the soil include arsenic, silver, selenium, mercury, and zinc. Arsenic concentrations were elevated at sample locations across the site and the risk ratios were extremely high. Mercury was present in elevated concentrations at only a few locations (main Magnolia waste pile [WP-4], and mill area); however, it has the potential to bioaccumulate. The lack of site-specific bioaccumulation data resulted in the retention of mercury as a CPEC. The highest concentrations of metals were generally reported for the main Magnolia waste pile (WP-4 near the lower settling pond). Arsenic appears to be the primary CPEC posing the most significant site-wide risk to plants, invertebrates, birds, and mammals. While individual receptors may be at risk from metal exposure at various locations throughout the site, their populations are unlikely to be significantly impacted in the vicinity of the mine because it is unlikely that populations of receptors reside strictly within the bounds of the site. Contaminated areas at the site offer lower habitat quality when compared to the adjoining habitat. Thus, it is unlikely that a receptor would be regularly utilizing habitat limited to within the contaminated areas.

Risk posed to wildlife and avian receptors from exposure to contaminated surface water is not elevated (risk ratios less than the Q-factor). There were very few CPECs identified for aquatic life receptors as a result of high risk ratios, including aluminum, barium, iron, and manganese. Risks to aquatic life from these CPECs were present only in the adit discharge. Additional CPECs identified as a result of their potential to bioaccumulate include mercury, selenium, silver, and zinc. Because of the lack of site-specific bioaccumulation data, risks from these CPECs could not be evaluated. These results illustrate that the Ajax and Magnolia Mines do not appear to be causing elevated risks to ecologic receptors exposed to surface water in Lucas Gulch.

Thirteen sediment CPECs (antimony, arsenic, cadmium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc) were identified as posing a risk to aquatic receptors from either direct exposure or bioaccumulation. Of these, antimony, chromium, copper, lead, manganese, and thallium presented risk to ecological receptors in only the settling ponds. Overall, the presence of elevated metal concentrations in the Lucas Gulch sediment indicates there is some risk to aquatic macroinvertebrates.

No CPECs were identified for pore water based on elevated risk ratios. Mercury and zinc were identified as CPECs based on their bioaccumulative potential and detection in the pore water. Although not detected in the pore water, silver was retained as a CPEC because the MDL was higher than the SLV.

Table B.9 provides a summary of the identified CPECs in each media for the separate ecological receptors.

Table B.9. CPEC Summary

CPEC	Soil/Waste Rock	Surface Water	Sediment	Pore Water
Aluminum		AL[1]		
Antimony	P		AL[1]	
Arsenic	P, I, B, M		AL	
Barium		AL[1]		
Cadmium			AL	
Chromium	P, I,		AL[1]	
Copper			AL[1]	
Iron	P, I,	AL[1]		
Lead	P, B		AL[1]	
Manganese	P, I,	AL[1]	AL[1]	
Mercury	P, I, B, M	AL	AL	AL
Nickel			AL	
Selenium	P, I, B, M	AL	AL	
Silver	P, I, B, M	AL	AL	AL
Thallium			AL[1]	
Vanadium	P			
Zinc	P, I, B, M	AL	AL	AL

Notes:
[1]Ecological risk pertains to aquatic life in the adits or sediment basins only.
AL = aquatic Life; B = birds; CPEC = contaminant of potential ecological concern; I = invertebrates; M = mammals; P = plants

5.0 REFERENCES

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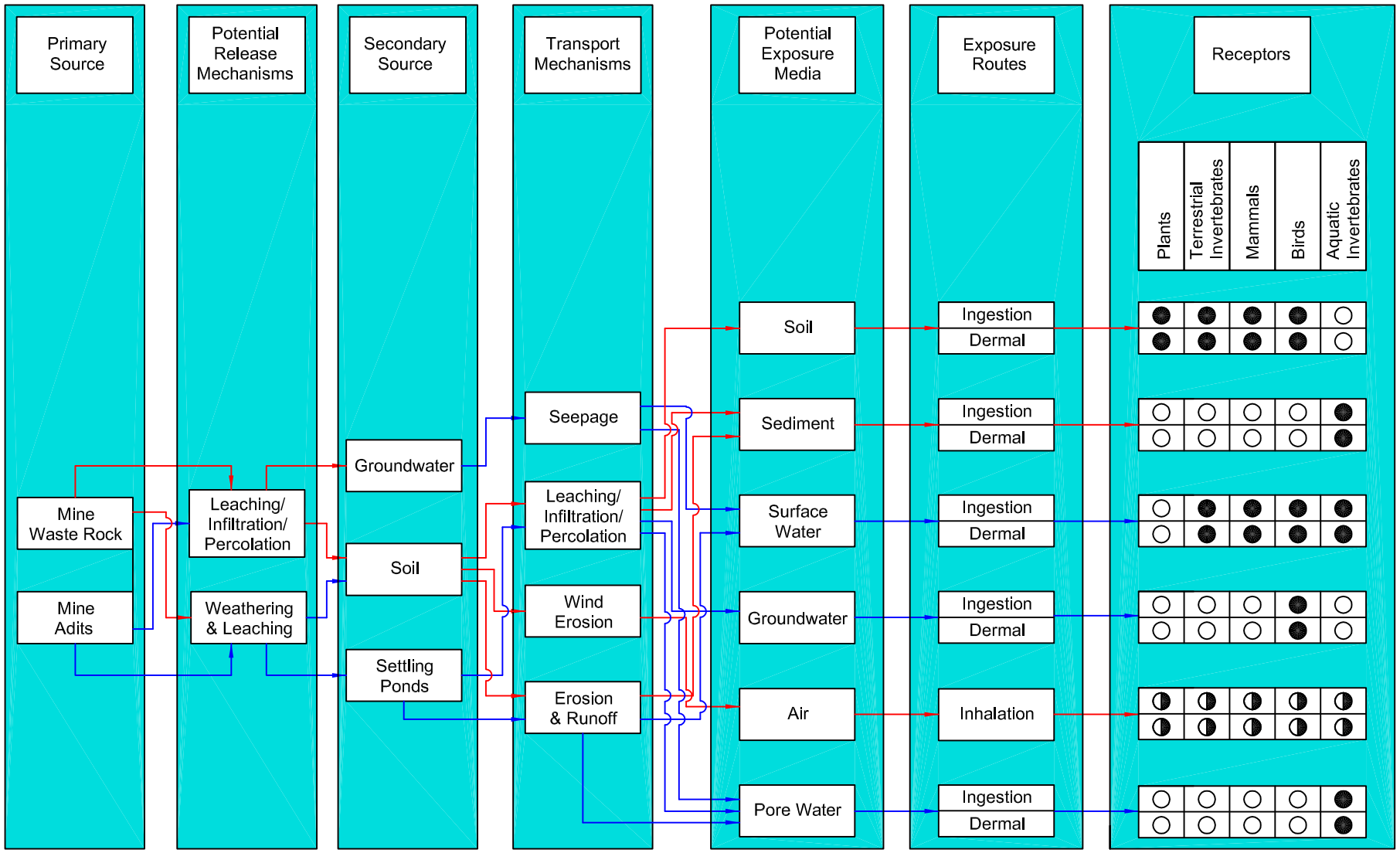

Legend

- ● Complete and potentially significant exposure pathway
- ◑ Potentially complete but insignificant exposure pathway
- ○ Incomplete exposure pathway

MSE Millenium Science and Engineering, Inc.
1605 North 13th Street
Boise, Idaho 83702
Phone: (208) 345-8292

Ecological Conceptual Site Exposure Model

B2473A	11-15-04	ERA CSM.dwg	FIGURE B.1

Attachments

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ATTACHMENT A
Ecological Scoping Checklist

Site Name	Ajax/Magnolia
Date of Site Visit	September 21 & 22, 2004
Site Location	3.5 miles N of Granite, Grant County, Oregon, Umatilla National Forest
Site Visit Conducted by	Johnna Evans

Part ❶

CONTAMINANTS OF INTEREST **Types, Classes, Or Specific Hazardous Substances ‡** **Known Or Suspected**	**Onsite**	**Adjacent to or in locality of the facility †**
Mining related activities – primarily metals	Yes	Yes

‡ As defined by OAR 340-122-115(30) † As defined by OAR 340-122-115(34)

Part ❷

OBSERVED IMPACTS ASSOCIATED WITH THE SITE	**Finding**
Onsite vegetation (**N**one, **L**imited, **E**xtensive)	E
Vegetation in the locality of the site (**N**one, **L**imited, **E**xtensive)	E
Onsite wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other (**N**one, **L**imited, **E**xtensive)	L
Wildlife such as macroinvertebrates, reptiles, amphibians, birds, mammals, other in the locality of the site (**N**one, **L**imited, **E**xtensive)	L
Other readily observable impacts (**N**one, **D**iscuss below)	D
Discussion: There are numerous waste rock piles scattered across the site. Many of the waste rock piles are vegetated with trees and some grasses. There are a couple of settling ponds that receive input from adit drainage.	

ATTACHMENT A
Ecological Scoping Checklist (cont'd)

Part ❸

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding
Terrestrial – Wooded	
Percentage of site that is wooded	95
Dominant vegetation type (**E**vergreen, **D**eciduous, **M**ixed)	E
Prominent tree size at breast height, i.e., 4 feet (<6", 6" to 12", >12")	6" – 12"
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	M, B, M
Terrestrial - Scrub/Shrub/Grasses	
Percentage of site that is scrub/shrub	<5
Dominant vegetation type (**Sc**rub, **Sh**rub, **G**rasses, **O**ther)	G, O
Prominent height of vegetation (<2', 2' to 5', >5')	<2'
Density of vegetation (**D**ense, **P**atchy, **S**parse)	D
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	M, B, M
Terrestrial – Ruderal	
Percentage of site that is ruderal	<5
Dominant vegetation type (**L**andscaped, **A**griculture, **B**are ground)	B
Prominent height of vegetation (0', >0' to <2', 2' to 5', >5')	<2'
Density of vegetation (**D**ense, **P**atchy, **S**parse)	S
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	M, M
Aquatic - Non-flowing (lentic)	
Percentage of site that is covered by lakes or ponds	<1
Type of water bodies (**L**akes, **P**onds, **V**ernal pools, **I**mpoundments, **Lag**oon, **R**eservoir, **C**anal)	P
Size (acres), average depth (feet), trophic status of water bodies	<1, <1, P
Source water (**R**iver, **St**ream, **G**roundwater, **I**ndustrial discharge, **Su**rface water runoff)	Su
Water discharge point (**N**one, **R**iver, **St**ream, **G**roundwater, **W**etlands impoundment)	S, W
Nature of bottom (**M**uddy, **R**ocky, **S**and, **C**oncrete, **O**ther)	M
Vegetation present (**S**ubmerged, **E**mergent, **F**loating)	E
Obvious wetlands present (**Y**es / **N**o)	Y
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	M, M

ATTACHMENT A
Ecological Scoping Checklist (cont'd)

SPECIFIC EVALUATION OF ECOLOGICAL RECEPTORS / HABITAT	Finding
Aquatic - Flowing (lotic)	
Percentage of site that is covered by rivers, streams (brooks, creeks), intermittent streams, dry wash, arroyo, ditches, or channel waterway	1
Type of water bodies (**R**ivers, **S**treams, **I**ntermittent Streams, **D**ry wash, **A**rroyo, **D**itches, **C**hannel waterway)	S
Size (acres), average depth (feet), approximate flow rate (cfs) of water bodies	<1, <6", 5
Bank environment (cover: **V**egetated, **B**are / slope: **S**teep, **G**radual / height (in feet))	V/S-G
Source water (**R**iver, **St**ream, **G**roundwater, **I**ndustrial discharge, **Su**rface water runoff)	Su, G
Tidal influence (**Y**es / **N**o)	N
Water discharge point (**N**one, **R**iver, **St**ream, **G**roundwater, **W**etlands impoundment)	S
Nature of bottom (**M**uddy, **R**ocky, **S**and, **C**oncrete, **O**ther)	R,M
Vegetation present (**S**ubmerged, **E**mergent, **F**loating)	E
Obvious wetlands present (**Y**es / **N**o)	Y
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	M,B,M
Aquatic – Wetlands	
Obvious or designated wetlands present (**Y**es / **N**o)	Y
Wetlands suspected as site is/has (**A**djacent to water body, in **F**loodplain, **S**tanding water, **D**ark wet soils, **M**ud cracks, **D**ebris line, **W**ater marks)	A,F,S
Vegetation present (**S**ubmerged, **E**mergent, **S**crub/shrub, **W**ooded)	E/S
Size (acres) and depth (feet) of suspected wetlands	<1, <1
Source water (**R**iver, **St**ream, **G**roundwater, **I**ndustrial discharge, **Su**rface water runoff)	Su, G
Water discharge point (**N**one, **R**iver, **St**ream, **G**roundwater, **I**mpoundment)	S
Tidal influence (**Y**es / **N**o)	N
Evidence / observation of wildlife (**M**acroinvertebrates, **R**eptiles, **A**mphibians, **B**irds, **M**ammals, **O**ther)	B,M

*** P**: Photographic documentation of these features is highly recommended.

Part ❹

ECOLOGICALLY IMPORTANT SPECIES / HABITATS OBSERVED
Creek/Wetlands
Redband trout observed by EA Engineering, Science, and Technology, Inc. (2004).

ATTACHMENT B
Evaluation of Receptor-Pathway Interactions

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in surface waters? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via surface water?**	X X X		
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in surface waters. • Ability of hazardous substances to migrate to surface waters. • Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters. Aquatic receptors may be exposed through osmotic exchange, respiration or ventilation of surface waters. • Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters. • Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.			
Are hazardous substances present or potentially present in groundwater? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via groundwater?**	X X	 X	
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in groundwater. • Ability of hazardous substances to migrate to groundwater. • Potential for hazardous substances to migrate via groundwater and discharge into habitats and/or surface waters. • Contaminants may be taken-up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1m depth). • Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

ATTACHMENT B
Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in sediments? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via contact with sediments?**	X X X		
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in sediment. • Ability of hazardous substances to leach or erode from surface soils and be carried into sediment via surface runoff. • Potential for contaminated groundwater to upwell through, and deposit contaminants in, sediments. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods. Aquatic receptors may be directly exposed to sediments or may be exposed through osmotic exchange, respiration or ventilation of sediment pore waters. • Terrestrial plants may be exposed to sediment in an area that is only periodically inundated with water. • If sediments are present in an area that is only periodically inundated with water, terrestrial species may have direct access to sediments for the purposes of incidental ingestion. Aquatic receptors may regularly or incidentally ingest sediment while foraging.			
Are hazardous substances present or potentially present in prey or food items of ecologically important receptors? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via consumption of food items?**	X X X		
When answering the above questions, consider the following: • Higher trophic level terrestrial and aquatic consumers and predators may be exposed through consumption of contaminated food sources. • In general, organic contaminants with log K_{ow} > 3.5 may accumulate in terrestrial mammals and those with a log K_{ow} > 5 may accumulate in aquatic vertebrates.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

ATTACHMENT B
Evaluation of Receptor-Pathway Interactions (cont'd)

EVALUATION OF RECEPTOR-PATHWAY INTERACTIONS	Y	N	U
Are hazardous substances present or potentially present in surficial soils? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via incidental ingestion of or dermal contact with surficial soils?**	X X X		
When answering the above questions, consider the following: • Known or suspected presence of hazardous substances in surficial (~1m depth) soils. • Ability of hazardous substances to migrate to surficial soils. • Significant exposure via dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash). • Contaminants in bulk soil may partition into soil solution, making them available to roots. • Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.			
Are hazardous substances present or potentially present in soils? **AND** **Are ecologically important species or habitats present?** **AND** **Could hazardous substances reach these receptors via vapors or fugitive dust carried in surface air or confined in burrows?**	X X 	 X	
When answering the above questions, consider the following: • Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant > 10^{-5} atm-m^3/mol and molecular weight < 200 g/mol). • Exposure via inhalation is most important to organisms that burrow in contaminated soils, given the limited amounts of air present to dilute vapors and an absence of air movement to disperse gases. • Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that could be exposed to dust disturbed by their foraging or burrowing activities or by wind movement. • Foliar uptake of organic vapors would be limited to those contaminants with relatively high vapor pressures. • Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces.			

"Y" = yes; "N" = No, "U" = Unknown (counts as a "Y")

Attachment C

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Table C1
Ecological Risk Assessment: Preliminary Screening - Soil/Waste Pile Data
(results are reported in mg/kg)

Analyte	Minimum Detected Concentration	Maximum Detected Concentration	90% UCL [1, 2]	Essential Nutrient?	Retained For Screening?	Detection Frequency	Retained for Screening?	Background Concentration	Include for Risk-Based Screening?
Aluminum	1340	23200	13900	No	**Yes**	100%	**Yes**	24400	No
Antimony	0.44**U**	78.5	45.1	No	**Yes**	87%	**Yes**	0.84	**Yes**
Arsenic	14.2	3730	2520	No	**Yes**	100%	**Yes**	4.5	**Yes**
Barium	25.5	340	196	No	**Yes**	100%	**Yes**	288	**Yes**
Beryllium	0.02	3.4	1.4	No	**Yes**	93%	**Yes**	1.2	**Yes**
Cadmium	0.01**U**	16.9	4.8	No	**Yes**	20%	**Yes**	0.43	**Yes**
Calcium	821	25100		Yes	No	-	**-**	1830	No
$Chromium_6$	0.49**B**	2.85**U**	1.83	No	**Yes**	22%	**Yes**	1.10	**Yes**
$Chromium_t$	5	63.5	26.6	No	**Yes**	100%	**Yes**	31.3	**Yes**
Cobalt	0.8	301	60.5	No	**Yes**	100%	**Yes**	11.3	**Yes**
Copper	13.6	310	129	No	**Yes**	100%	**Yes**	30.7	**Yes**
Iron	9207	139000	58700	Yes	**Yes**	100%	**Yes**	24600	**Yes**
Lead	5	1210	309	No	**Yes**	100%	**Yes**	8.4	**Yes**
Magnesium	155	10500	9730	Yes	No	-	**-**	2630	No
Manganese	8.3	34300	19300	No	**Yes**	100%	**Yes**	837	**Yes**
Mercury	0.11	9.4	7.96	No	**Yes**	100%	**Yes**	0.14	**Yes**
Nickel	6.6	888	268	No	**Yes**	100%	**Yes**	23.4	**Yes**
Potassium	1340	5260		Yes	No	-	**-**	1570	No
Selenium	0.07**U**	11.6	4.6	No	**Yes**	93%	**Yes**	0.76	**Yes**
Silver	0.04**U**	57.7	116	No	**Yes**	87%	**Yes**	0.26	**Yes**
Sodium	10.2**U**	869		Yes	No	-	**-**	806	No
Thallium	0.18	36.3	7.1	No	**Yes**	93%	**Yes**	0.97	**Yes**
Vanadium	8.8	176	69.7	No	**Yes**	100%	**Yes**	47.8	**Yes**
Zinc	5.5	1620	490	No	**Yes**	100%	**Yes**	105	**Yes**
Cyanide	0.21**U**	4.9	2.32	No	**Yes**	11%	**Yes**	0.27	**Yes**

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit.

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration.

1. Rejected for both normal and lognormal distributions so 90% UCL calculated using Chebyshev Inequality method for nonparametric data (beryllium, cadmium, lead, nickel, and selenium).
2. When there were fewer than 10 samples or the 90% UCL was greater than MDC, the MDC was used as the EPC (chromium6, silver, and cyanide).

Table C2
Ecological Risk Assessment: Preliminary Screening - Surface Water
(concentrations are reported in µg/l)

Analyte [1]	Minimum Detected Concentration	Maximum Detected Concentration	Detection Frequency	Retained for Screening?	Background Concentration	Retained for Screening?	Essential Nutrient?	Include for Risk-Based Screening?
Aluminum[2]	27.7**B**	1180	100%	**Yes**	30.2**B**	**Yes**	No	**Yes**
Antimony	1.9**U**	5.6**B**	100%	**Yes**	4.1**B**	**Yes**	No	**Yes**
Arsenic	1.2**U**	63.6	100%	**Yes**	1.2**U**	**Yes**	No	**Yes**
Barium	9.8**B**	71.7**B**	100%	**Yes**	55.2**B**	**Yes**	No	**Yes**
Beryllium	0.1**U**	0.1**U**	0%	No				
Cadmium	0.3**U**	0.3**U**	0%	No				
Calcium	21500	134000	100%	**Yes**	28200	**Yes**	Yes	No
$Chromium_6$	0.0**U**	0.01	17%	**Yes**	0.02	No	-	-
$Chromium_t$	0.3**U**	0.7**U**	100%	**Yes**	0.3**U**	**Yes**	No	**Yes**
Cobalt	0.9**U**	13.3**B**	100%	**Yes**	0.9**U**	**Yes**	No	**Yes**
Copper	0.7**U**	10.3**B**	100%	**Yes**	0.7**U**	**Yes**	No	**Yes**
$Cyanide_t$	5**U**	5**U**	0%	No				
Iron	8.4**U**	10500	100%	**Yes**	38.8**B**	**Yes**	No	**Yes**
Lead	0.65**U**	4.4	100%	**Yes**	0.75**U**	**Yes**	No	**Yes**
Magnesium	10600	69800	100%	**Yes**	12800	**Yes**	Yes	No
Manganese	4.7**B**	1690	100%	**Yes**	3.3**B**	**Yes**	No	**Yes**
Mercury	0.05**U**	0.48	100%	**Yes**	0.1**B**	**Yes**	No	**Yes**
Nickel	1**U**	64.7	100%	**Yes**	1**U**	**Yes**	No	**Yes**
Potassium	1480**B**	4800**B**	100%	**Yes**	2420**B**	**Yes**	Yes	No
Selenium	0.85**U**	1.8**B**	100%	**Yes**	2.4**B**	No	-	-
Silver	1.2**U**	1.2**U**	0%	No	1.2**U**	-	-	-
Sodium	5200	6700	67%	**Yes**	6480	**Yes**	Yes	No
Thallium	1.4**U**	4.3**B**	100%	**Yes**	1.4**U**	**Yes**	No	**Yes**
Vanadium	1**U**	2.5**B**	100%	**Yes**	1.1**U**	**Yes**	No	**Yes**
Zinc	2.85**U**	83	100%	**Yes**	2.85**U**	**Yes**	No	**Yes**

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration

1. Analyte is reported as the dissolved concentration in the water column, unless otherwise noted.
2. The concentration of Aluminum is reported as the total concentration in the water column.

Table C3
Ecological Risk Assessment: Preliminary Screening - Sediment
(*concentrations are reported in mg/kg*)

Analyte	Minimum Detected Concentration	Maximum Detected Concentration	Detection Frequency	Retained for Screening?	Background Concentration	Retained for Screening?	Essential Nutrient?	Retained for Screening?
Aluminum	1550	46500	100%	**Yes**	14900	**Yes**	No	**Yes**
Antimony	1.5**B**	12.2**B**	100%	**Yes**	0.23**U**	**Yes**	No	**Yes**
Arsenic	121	2800	100%	**Yes**	1.3	**Yes**	No	**Yes**
Barium	40.2	309	100%	**Yes**	502	No	No	**Yes**
Beryllium	0.42**B**	3.8	100%	**Yes**	0.44**B**	**Yes**	No	**Yes**
Cadmium	0.16**B**	9.3	100%	**Yes**	0.0295**U**	**Yes**	No	**Yes**
Calcium	923	33300	100%	**Yes**	5500	**Yes**	Yes	No
$Chromium_t$	4.4	54.9	100%	**Yes**	14.9	**Yes**	No	**Yes**
Cobalt	3.1**B**	254	100%	**Yes**	9.6	**Yes**	No	**Yes**
Copper	32.8	461	100%	**Yes**	14.3	**Yes**	No	**Yes**
Iron	23200	319000	100%	**Yes**	20700	**Yes**	Yes	**Yes**
Lead	4.6	69.4	100%	**Yes**	3.8	**Yes**	No	**Yes**
Magnesium	1010	8630	100%	**Yes**	3910	**Yes**	Yes	No
Manganese	319	40600	100%	**Yes**	424	**Yes**	No	**Yes**
Mercury	0.42	1.4	100%	**Yes**	0.02**B**	**Yes**	No	**Yes**
Nickel	6.6	860	100%	**Yes**	24.3	**Yes**	No	**Yes**
Potassium	848	5430	100%	**Yes**	394**B**	**Yes**	Yes	No
Selenium	0.45**B**	11.6	100%	**Yes**	0.48**B**	**Yes**	No	**Yes**
Silver	0.3	3.6	67%	**Yes**	0.105**U**	**Yes**	No	**Yes**
Sodium	64.5**U**	599**B**	67%	**Yes**	764	No	Yes	No
Thallium	0.31**U**	7.8**U**	33%	**Yes**	0.28**U**	**Yes**	No	**Yes**
Vanadium	17.8	90.2	100%	**Yes**	34.2	**Yes**	No	**Yes**
Zinc	50.3	1660	100%	**Yes**	21.8	**Yes**	No	**Yes**
Cyanide	0.24**U**	2.9	33%	**Yes**	0.32	**Yes**	No	**Yes**

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration

Table C4
Ecological Risk Assessment Preliminary Screening - Pore Water
(*concentrations are reported in µg/l*)

Analyte [1]	Minimum Detected Concentration	Maximum Detected Concentration	Detection Frequency	Retained for Screening?	Background Concentration	Retained for Screening?	Essential Nutrient?	Retain for Screening?
Aluminum	11.8**U**	28**B**	33%	**Yes**	60.7**B**	No	-	-
Antimony	2.35**U**	2.35**U**	0%	No	-	-	-	-
Arsenic	11.5	27.3	100%	**Yes**	1.2**U**	**Yes**	No	**Yes**
Arsenic(III)[2]	0.05**U**	26.9	67%	**Yes**	0.05**U**	**Yes**	No	**Yes**
Arsenic(V)[2]	54.4	258	100%	**Yes**	0.05**U**	**Yes**	No	**Yes**
Barium	74.2**B**	84.1**B**	100%	**Yes**	74.4**B**	**Yes**	No	**Yes**
Beryllium	0.1**U**	0.1**U**	0%	No	-	-	-	
Cadmium	0.3**U**	0.3**U**	0%	No	-	-	-	
Calcium	41700	44200	100%	**Yes**	29200	**Yes**	Yes	No
$Chromium_6$	0	0.01	33%	**Yes**	0.01	No	-	**-**
$Chromium_t$	0.7**U**	0.7**U**	0%	No	2.1**B**	-	-	**-**
Cobalt	1**U**	1**U**	0%	No	-	-	-	-
Copper	1.2**U**	1.2**U**	0%	No	-	-	-	-
$Cyanide_t$	5**U**	5**U**	0%	No	-	-	-	-
Iron	34.9**B**	86.9**B**	100%	**Yes**	40.4**B**	**Yes**	No	**Yes**
Lead	0.65**U**	0.65**U**	0%	No	-	-	-	-
Magnesium	19200	20000	100%	**Yes**	12500	**Yes**	Yes	No
Manganese	3.7**B**	15.2	100%	**Yes**	4**B**	**Yes**	No	**Yes**
Mercury	0.05**U**	0.19**B**	67%	**Yes**	0.11**B**	**Yes**	No	**Yes**
Nickel	1.05**U**	1.05**U**	0%	No	-	-	-	-
Potassium	2380**B**	2480**B**	100%	**Yes**	2150**B**	**Yes**	Yes	No
Selenium	1.7**U**	1.7**U**	0%	No	-	-	-	-
Silver	1.1**U**	1.1**U**	0%	No	-	-	-	-
Sodium	6320	7420	100%	**Yes**	6550	**Yes**	Yes	No
Thallium	1.4**U**	2.85**U**	0%	No	1.4**U**	**-**	-	**-**
Vanadium	1**U**	1**U**	0%	No	-	-	-	-
Zinc	5**B**	9.7**B**	100%	**Yes**	2.85**U**	**Yes**	No	**Yes**

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration

1. Analyte is reported as the dissolved concentration in the water column, unless otherwise noted.
2. Analyte is reported as the total concentration in the water column.

Table C5
Ecological Risk Assessment: Chemistry-Toxicity Screening - Soil/Waste Rock
(concentrations are reported as mg/kg)

			SCREENING LEVEL VALUES (ODEQ, 2001)				RISK RATIOS (T_{ij})				RISK POSED TO NON-PROTECTED RECEPTORS? (T_{ij} > 5)				CPEC?	MULTIPLE COI RISK (T_{ij}/T_j)				MULTIPLE COI RISK POSED TO NON-PROTECTED RECEPTORS? (T_{ij}/T_j > 5/Nij)				CPEC?	Bioaccumulator CPEC?
Analyte[1]	EPC (Max)[2]	EPC (90%)[3,4,5]	Plant	Invertebrate	Bird	Mammal	Plant	Invertebrate	Bird	Mammal	Plant	Invertebrate	Bird	Mammal		Plant	Invertebrate	Bird	Mammal	Plant	Invertebrate	Bird	Mammal		
Antimony	78.5	45.1	5	NA	NA	15	15.7000	-	-	3.0067	**YES**	**-**	**-**	NO	**YES**	0.0011	-	-	0.0290	NO	**-**	**-**	NO	NO	NO
Arsenic [6]	3730	2520	10	60	10	29	373.0000	62.1667	252	86.8966	**YES**	**YES**	**YES**	**YES**	**YES**	0.0253	0.0451	0.8272	0.8393	NO	NO	**YES**	**YES**	**YES**	NO
Barium	340	196	500	3000	85	638	0.6800	0.1133	2.3059	0.3072	NO	NO	NO	NO	NO	0.0000	0.0001	0.0076	0.0030	NO	NO	NO	NO	NO	NO
Beryllium [7]	3.4	1.4	10	10	10	83	0.3400	0.3400	0.1400	0.0169	NO	NO	NO	NO	NO	0.0000	-	-	0.0002	NO	**-**	-	NO	NO	NO
Cadmium	16.9	4.8	4	20	6	125	4.2250	0.8450	0.8000	0.0384	NO	NO	NO	NO	NO	0.0003	0.0006	0.0026	0.0004	NO	NO	NO	NO	NO	**YES**
$Chromium_6$	2.85**U**	1.83	NA	NA	NA	410	-	-	-	0.0070	-	-	-	NO	NO	-	-	-	0.0001	-	-	-	NO	NO	NO
$Chromium_t$ [8]	63.5	26.6	1	0.4	4	410	63.5000	158.7500	6.6500	0.0649	**YES**	**YES**	**YES**	NO	**YES**	0.0043	0.1153	0.0218	0.0006	NO	NO	NO	NO	NO	NO
Cobalt	301	60.5	20	1000	NA	150	15.0500	0.3010	-	0.4033	**YES**	NO	**-**	NO	**YES**	0.0010	0.0002	-	0.0039	NO	NO	-	NO	NO	NO
Copper	310	129	100	50	190	390	3.1000	6.2000	0.6789	0.3308	NO	**YES**	NO	NO	**YES**	0.0002	0.0045	0.0022	0.0032	NO	NO	NO	NO	NO	NO
Iron	139000	58700	10	200	NA	NA	13900	695	-	-	**YES**	**YES**	**-**	**-**	**YES**	0.9439	0.5047	-	-	**YES**	**YES**	-	-	**YES**	NO
Lead	1210	309	50	500	16	4000	24.2000	2.4200	19.3125	0.0773	**YES**	NO	**YES**	NO	**YES**	0.0016	0.0018	0.0634	0.0007	NO	NO	NO	NO	NO	NO
Manganese	34300	19300	500	100	4125	11000	68.6000	343.0000	4.6788	1.7545	**YES**	**YES**	NO	NO	**YES**	0.0047	0.2491	0.0154	0.0169	NO	NO	NO	NO	NO	NO
Mercury	9.4	7.96	0.3	0.1	1.5	73	31.3333	94.0000	5.3067	0.1090	**YES**	**YES**	**YES**	NO	**YES**	0.0021	0.0683	0.0174	0.0011	NO	NO	NO	NO	NO	**YES**
Nickel	888	268	30	200	320	625	29.6000	4.4400	0.8375	0.4288	**YES**	NO	NO	NO	**YES**	0.0020	0.0032	0.0027	0.0041	NO	NO	NO	NO	NO	NO
Selenium	11.6	4.6	1	70	2	25	11.6000	0.1657	2.3000	0.1840	**YES**	NO	NO	NO	**YES**	0.0008	0.0001	0.0075	0.0018	NO	NO	NO	NO	NO	**YES**
Silver	57.7	116	2	50	NA	NA	28.8500	1.1540	-	-	**YES**	NO	**-**	**-**	**YES**	0.0020	0.0008	-	-	NO	NO	-	-	NO	**YES**
Thallium	36.3	7.1	1	NA	NA	1	36.3000	-	-	7.1000	**YES**	**-**	**-**	**YES**	**YES**	0.0025	-	-	0.0686	NO	-	-	NO	NO	NO
Vanadium	176	69.7	2	NA	47	25	88.0000	-	1.4830	2.7880	**YES**	**-**	NO	NO	**YES**	0.0060	-	0.0049	0.0269	NO	-	NO	NO	NO	NO
Zinc	1620	490	50	200	60	20000	32.4000	8.1000	8.1667	0.0245	**YES**	**YES**	**YES**	NO	**YES**	0.0022	0.0059	0.0268	0.0002	NO	NO	NO	NO	NO	**YES**
Cyanide	4.9	2.32	NA	NA	NA	NA	**-**	**-**	-	**-**	**-**	**-**	**-**	**-**	**YES**	-	-	-	-	**-**	**-**	**-**	-	-	NO
					Sum of T_{ij} (T_j) =		14726.478	1376.995714	304.6599297	103.53776															
					# of COIs (N_{ij}) =		18	15	13	17															
					5/N_{ij} =		0.2777778	0.333333333	0.384615385	0.2941176															

Abbreviations:
EPC - exposure point concentration
NP - non protected
NA - not available
CPEC - constituent of potential ecological concern
U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit

Notes:
1. Chemicals retained after preliminary screening (essential nutrient, detection frequency, and background concentration comparison).
2. The EPC is equal to the maximum detected concentration. This EPC is used for plant and invertebrate receptors.
3. The EPC is equal to the 90% upper confidence limit. This EPC is used for bird and wildlife receptors.
4. Rejected for both normal and lognormal distributions so 90% UCL calculated using Chebyshev Inequality method for nonparametric data (beryllium, cadmium, lead, nickel, and selenium).
5. When there were fewer than 10 samples or the 90% UCL was greater than MDC, we used the MDC as the EPC ($chromium_6$, silver, and cyanide).
6. SLVs for Arsenic(III) are listed.
7. Efroymson, R.A., M.E. Will, and G.W. Suter II. 1997. Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Hetertrophic Process: 1997 Revision. ES/ER/TM-162/R2. Prepared for the US Department of En
8. SLVs for plant, invertebrate, and bird receptors is based on Chromium(III) and SLV for mammal receptors is based on Chromium(VI).

Table C6
Ecological Risk Assessment: Chemistry-Toxicity Screening - Surface Water
(concentrations are reported in µg/l)

		SCREENING LEVEL VALUES (ODEQ, 2001)			SINGLE COI RISK RATIO [7]			RISK TO RECEPTORS? *Non-Protected* [8]			*Protected* [9]	CPEC?	MULTIPLE COI RISK RATIO [10]	RISK TO RECEPTORS? *Non-Protected* [11]	*Protected* [12]	CPEC?
Analyte [1,2]	**EPC**	Aquatic Life	Bird	Mammal	Aquatic Life	Bird	Mammal	Aquatic Life	Birds	Mammals	Aquatic Life		Aquatic Life	Aquatic Life	Aquatic Life	
Aluminum [3]	1180	87	797000	8000	13.5632	0.0015	0.1475	**YES**	NO	NO	**YES**	**YES**	0.2298	NO	**YES**	**YES**
Antimony	5.6**B**	1600	NA	1000	0.0035	-	0.0056	NO	-	NO	NO	NO	0.0001	NO	NO	NO
Arsenic [4]	63.6	150	18000	6000	0.4240	0.0035	0.0106	NO	NO	NO	NO	NO	0.0072	NO	NO	NO
Barium	71.7**B**	4	150000	39000	17.9250	0.0005	0.0018	**YES**	NO	NO	**YES**	**YES**	0.3037	**YES**	**YES**	**YES**
$Chromium_t$ [5]	0.7**U**	11	7200	25000	0.0636	0.0001	0.0000	NO	NO	NO	NO	NO	0.0011	NO	NO	NO
Cobalt	13.3**B**	23	NA	9000	0.5783	-	0.0015	NO	-	NO	NO	NO	0.0098	NO	NO	NO
Copper	10.3**B**	36.2**H**	341000	53000	0.2845	0.00003	0.0002	NO	NO	NO	NO	NO	0.0048	NO	NO	NO
Iron	10500	1000	NA	NA	10.5000	-	-	**YES**	-	-	**YES**	**YES**	0.1779	NO	**YES**	**YES**
Lead	4.4	14.07**H**	28000	323000	0.3127	0.0002	0.0000	NO	NO	NO	NO	NO	0.0053	NO	NO	NO
Manganese	1690	120	7242000	676000	14.0833	0.0002	0.0025	**YES**	NO	NO	**YES**	**YES**	0.2386	NO	**YES**	**YES**
Mercury [6]	0.48	0.77	3300	10000	0.6234	0.0001	0.0000	NO	NO	NO	NO	NO	0.0106	NO	NO	NO
Nickel	64.7	263.2**H**	562000	38000	0.2458	0.0001	0.0017	NO	NO	NO	NO	NO	0.0042	NO	NO	NO
Thallium	4.3**B**	40	NA	60	0.1075	-	0.0717	NO	-	NO	NO	NO	0.0018	NO	NO	NO
Vanadium	2.5**B**	20	82000	1600	0.1250	0.0000	0.0016	NO	NO	NO	NO	NO	0.0021	NO	NO	NO
Zinc	83	471.4**H**	105000	1230000	0.1761	0.0008	0.0001	NO	NO	NO	NO	NO	0.0030	NO	NO	NO
				Sum of T_{ij} (T_j) =	59.0160	0.0071	0.2448									
				# COIs (N_{ij}) =	19	11	14									
				$1/N_{ij}$ =	0.0526	0.0909	0.0714									
				$5/N_{ij}$ =	0.2632	0.4545	0.3571									

Abbreviations:
EPC - exposure point concentration
NA - not available
CPEC - contaminant of potential ecological concern
U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit
B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration
H - The screening level value was adjusted based on the hardness of the water at the location of the maximum observed concentration.

Notes:
1. Chemicals retained after preliminary screening (essential nutrient, detection frequency, and background concentration comparison).
2. According to the SI: beryllium, cadmium, cyanide, and silver were not detected in any samples.
3. The SLV is based on total concentrations; therefore, the EPC is expressed as the total concentration.
4. Arsenic screening level values were obtained from ODEQ, 2001 - Arsenic III.
5. Screening level values for Chromiumt were based on the most conservative value of Chromium III or Chromium VI in the Level II guidance document (ODEQ, 2001).
6. Although the SLV for mercury is based on the total concentration, we used the dissolved concentration because it was reported as being greater than the total.
7. Single COI risk ratio (Tij) = EPC/SLV
8. Risk posed to a non-protected receptor from a single COI is evaluated by: Tij > 5
9. Risk posed to a protected receptor from a single COI is evaluated by: Tij > 1
10. Multiple COI risk ratio = Tij/Tj; provided Tj > Q. Tj for birds and mammals was less than 5; therefore, risk from exposure to multiple COIs was not evaluated for these receptors.
11. Risk posed to a non-protected receptor from multiple COIs is evaluated by: Tij/Tj > 5/Nij
12. Risk posed to a protected receptor from multiple COIs is evaluated by: Tij/Tj > 1/Nij

Table C7
Ecological Risk Assessment: Chemistry-Toxicity Screening - Sediment
(concentrations are reported as mg/kg)

		SLVs (ODEQ, 2001)		RISK RATIOS (T_{ij})		CPEC? [2]
Analyte [1,2]	**EPC**	**Freshwater Sediment**	**Bioaccumulation**	**Freshwater Sediment**	**Bioaccumulation**	
Aluminum	46500	NA	NA	-	-	**Yes** [3]
Antimony	12.2**B**	3	10	4.066666667	1.22	**Yes**
Arsenic	2800	6	4	466.6666667	700	**Yes**
Beryllium	3.8	NA	122	-	0.031147541	**Yes**
Cadmium	9.3	0.6	0.003	15.5	3100	**Yes**
$Chromium_t$	54.9	37	4200	1.483783784	0.013071429	**Yes**
Cobalt	254	NA	NA	-	-	**Yes** [3]
Copper	461	36	10	12.80555556	46.1	**Yes**
Iron	319000	NA	NA	-	-	**Yes** [3]
Lead	69.4	35	128	1.982857143	0.5421875	**Yes**
Manganese	40600	1100	NA	36.90909091	-	**Yes**
Mercury	1.4	0.2	NA	7	-	**Yes**
Nickel	860	18	316	47.77777778	2.721518987	**Yes**
Selenium	11.6	NA	0.1	-	116	**Yes**
Silver	3.6	4.5	NA	0.8	-	**Yes**
Thallium	7.8**U**	NA	0.7	-	11.14285714	**Yes**
Vanadium	90.2	NA	NA	-	-	**Yes** [3]
Zinc	1660	123	3	13.49593496	553.3333333	**Yes**
Cyanide	2.9	NA	NA	-	-	**Yes** [3]

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration

1. Chemicals retained after preliminary screening (essential nutrient, detection frequency, and background concentration comparison).
2. CPECs were identified by $T_{ij} \geq 1$
3. These chemicals were retained as CPECs due to the lack of SLVs.

Table C8
Ecological Risk Assessment: Chemistry-Toxicity Screening - Pore Water
(concentrations are reported as µg/l)

Analyte [1, 2]	**EPC**	**Aquatic Life SLV**	**Risk Ratio for Aquatic Life** (T_{ij})	**Aquatic Life (NP) CPEC?** [4]
Arsenic	27.3	150	0.1820	No
Arsenic(III) [3]	26.9	150	0.1793	No
Arsenic(V) [3]	258	150	1.7200	No
Barium	84.1**B**	4	21.0250	**Yes**
Iron	86.9**B**	1000	0.0869	No
Manganese	15.2	120	0.1267	No
Mercury	0.19**B**	0.77	0.2468	No
Thallium	2.85**U**	40	0.0713	No
Zinc	9.7**B**	120	0.0808	No

Notes:

U - Analyzed for but not detected at detection limit; value = 1/2 of detection limit.

B - Detected at concentration between method detection limit and practical quantitation limit; value = reported concentration.

EPC - exposure point concentration

CPEC - Constituent of potential environmental concern

NP - non protected

P - protected

1. Chemicals retained after preliminary screening (essential nutrient, detection frequency, and background concentration comparison).
2. Concentration is reported as the dissolved concentration in the water column, unless otherwise noted.
3. Analyte is reported as the total concentration in the water column.
4. A chemical is an identified CPEC if it poses a risk to non-protected aquatic life. Assessed by: $T_{ij} > 5$

APPENDIX C

APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

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Table C–1. Chemical-Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
FEDERAL			
Safe Drinking Water Act	40 USC §300		
National Primary Drinking Water Regulations	40 CFR Part 141	Establishes health-based standards, maximum contaminant levels (MCLs), for public water systems.	Not an ARAR, groundwater has been eliminated from the removal action.
National Secondary DrinkingWater Regulations	40 CFR Part 143	Establishes aesthetic standards (secondary MCLs) for public water systems	Not an ARAR, these are not enforceable standards and are outside scope of removal action.
Clean Water Act	33 USC §§1251-1387		
National Ambient Water Quality Criteria	40 CFR Part 131	Sets criteria for water quality based on toxicity to aquatic organisms and human health.	Not an ARAR since the State of Oregon has been delegated this program.
Clean Air Act	40 USC §7409		
National Primary and Secondary Ambient Air Quality Standards	40 CFR Part 50	Establishes air quality levels that protect public health.	Not an ARAR—only "major" sources are subject to requirements related to NAAQS, defer to state regulation of fugitive dust emissions.
Resource Conservation and Recovery Act	40 USC §7601		
Lists of Hazardous Wastes	40 CFR Part 261, Subpart D and C	Defines those solids wastes which are subject to regulation as hazardous wastes under 40 CFR Parts 262-265 and Parts 124, 270, and 271.	Not an ARAR – mine waste is not a listed hazardous waste, Bevill exempt. Even if TCLP testing confirmed a characteristic waste (Subpart C), it is still exempt. Parts of the RCRA regulations may be relevant and appropriate, however, and are discussed under action-specific requirements.

Table C–1. Chemical-Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon (continued)

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
STATE OF OREGON			
Hazardous Substance Remedial Action Rules	OAR 340-122-84 and 1-115	Establishes DEQ Guidelines for assessing human health and ecological risk assessments on potential adverse affects from contamination according to DEQ risk guidelines and levels.	Relevant and Appropriate Requirement
Preliminary Remediation Goals (PRGs) for soil and water	US Environmental Protection Agency (EPA) Region 9	Preliminary Remediation Goals (PRGs) are tools for evaluating and cleaning up contaminated sites. They are risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements. The PRGs contained in the Region 9 PRG Table are generic; they are calculated without site specific information. However, they may be re-calculated using site specific data. PRGs should be viewed as Agency guidelines, not legally enforceable standards. They are used for site "screening" and as initial cleanup goals if applicable.	Relevant and Appropriate Requirement
Hazardous Substance Occupational Exposure	OAR 437	Establishes OR-OSHA Permissible Exposure Limits (PELs). OR-OSHA exposure limits mirror the federal chemical specific limits (refer to NIOSH Pocket Guide to Chemical Hazards for details on individual chemicals)	Relevant and Appropriate Requirement
Numeric Soil Cleanup Levels for Motor Fuel and Heating Oil	OAR 340-122-305 through 360	Establish cleanup standards for contamination of soil by motor fuel and heating oil.	To Be Considered at Former Oil Tank Station
Oregon Soil Cleanup Rules for Simple Sites	OAR 340-122-045 and 046	Establishes DEQ rules for streamlined cleanup processes and numerical cleanup standards at simple sites.	To Be Considered
State of Oregon is authorized by the USEPA to implement the Clean Water Act in Oregon	Clean Water Act – FWQC 40 CFR	Establishes acceptable contaminant levels for ingestion of aquatic organisms and for intake by aquatic organisms in surface water.	Applicable Requirement
Asbestos Removal	OAR 340-32-5620 through 5650	Establish DEQ requirements for licensing and certification for asbestos workers. All workers who handle asbestos-containing materials must meet certain training, licensing and certification requirements.	Relevant and Appropriate Requirement

Table C–2. Location–Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
FEDERAL			
Resource Conservation and Recovery Act	40 USC § 7601		
Hazardous and Solid Waste Regulations	40 CFR Part 264.18	Location standards and restrictions for hazardous waste treatment, storage, and disposal (TSD) facilities.	Relevant and Appropriate Requirement
	40 CFR §§ 257.3-1 through 257.3-4	Location standards and restrictions for municipal solid waste (MSW) facilities.	Relevant and Appropriate Requirement
National Historic Preservation Act	16 USC § 470; 36 CFR Part 800 40 CFR 6.301(b)	Requires Federal Agencies to take into account the effect of any Federally assisted undertaking or licensing on any property with historic, architectural, archeological, or cultural value that is included in or eligible for inclusion in the National Register of Historic Places.	Applicable Requirement
Archeological and Historic Preservation Act	16 USC § 469 40 CFR 6.301(c)	Establishes procedures to provide for preservation of significant scientific, prehistoric, historic, and archeological data that might be destroyed through alteration of terrain as a result of a Federal construction project or a Federally licensed activity or program.	Applicable Requirement
Protection of Wetlands Executive Order No. 11990	40 CFR Part 6; Appendix A, 40 CFR 6.302(a)	Avoid adverse impacts associated with the destruction or loss of wetlands and avoid support of new construction in wetlands if a practicable alternative exists.	Applicable Requirement
Dredge and Fill Regulations	33 USC § 1344, 33 CFR 323.1 et. seq.	Prohibits discharge of dredged or fill material into waters of the United States without a permit	Relevant and Appropriate Requirement
Fish and Wildlife Coordination Act	16 USC Chapter 49, §§ 2901-2912; 40 CFR 6.302(g)	Requires consultation when Federal department or agency proposes or authorizes any modification of any stream or other water body to assure adequate protection of fish and wildlife resources.	Not an ARAR – no stream modification is contemplated for this removal action.

Table C–2. Location–Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon (continued)

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
FEDERAL (continued)			
Floodplain Management Executive	Order No. 11988 40 CFR Part 6, Appendix A 40 CFR 6.302(b)	Requires Federal agencies to evaluate the potential effects of actions they may take in a floodplain to avoid the adverse impacts associated with direct and indirect development of a floodplain to the extent possible.	Applicable Requirement
Endangered Species Act	16 USC §§ 1531-1543; 40 CFR 6.302 (h); 50 CFR Part 402	Activities may not jeopardize the continued existence of any threatened or endangered species or destroy or adversely modify a critical habitat.	Applicable Requirement
Bald Eagle Protection Act	16 USC §§ 668 et seq.	Requires continued consultation with the USFWS during remedial design and remedial construction to ensure that any cleanup of the site does not unnecessarily adversely affect the bald or golden eagle.	Applicable Requirement
Migratory Bird Treaty Act	16 USC §§ 703 et seq.	Establishes federal responsibility for the protection of the international migratory bird resource and requires continued consultation with the USFWS during remedial design and remedial construction to ensure that the cleanup of the site does not unnecessarily impact migratory birds.	Applicable Requirement

Table C–3. Action–Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
FEDERAL			
Clean Water Act	33 USC § 1342		
National Pollutant Discharge Elimination System	40 CFR Part 122.26	In general, Part 122 provides permit requirements for the discharge of pollutants from any point source into waters of the United States. Part 122.26 requires permits for storm-water discharges.	Applicable Requirement
Surface Mining Control and Reclamation Act	30 USC §§ 1201-1328	Performance standards for surface mining activities.	Relevant and Appropriate Requirement
Hazardous Materials Transportation Act	49 USC §§ 1801-1813 49 CFR Parts 10, 171-177	Regulates transportation of hazardous materials.	Applicable Requirement
Resource Conservation and Recovery Act	46 USC § 7601		
Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal (TSD) Facilities	40 CFR Part 264.13.14	Requirements for proper handling, treatment, storage, and disposal of hazardous wastes.	Applicable Requirement
Land Disposal Restrictions (LDRs)	40 CFR Part 268	LDRs place specific restrictions (conc. or trmt) on RCRA hazardous wastes prior to their placement in a land disposal unit. Relevant and appropriate LDR requirements will be met if any material accumulations are treated ex situ.	Applicable Requirement
Disposal of Solid Waste	RCRA 42 U.S.C. § 6901 et seq; 40 CFR 257	Facility or practices in floodplains will not restrict flow of basic flood, reduce the temporary water storage capacity of the floodplain or otherwise result in a wash-out of solid waste.	Applicable Requirement

Table C–3. Action–Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon (continued)

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
FEDERAL (continued)			
Closure Requirements	RCRA/HWMA 40 CFR & 264, Subpart G	Closure of hazardous waste repositories must meet protective standards. Regulations to minimize contaminant migration, provide leachate collection and prevent contaminant exposure will be met.	Applicable Requirement
Landfill Design and Construction	RCRA/HWMA 40 CFR & 264, Subpart N	Hazardous waste landfills must meet minimum design standards. Protectiveness will be achieved through capping and institutional controls.	Applicable Requirement
Groundwater Monitoring	RCRA/HWMA 40 CFR & 264, Subpart F 40 CFR & 264, Subpart X	Establishes standards for detection and compliance monitoring. Site wide monitoring will accommodate specific groundwater monitoring requirements.	Relevant and Appropriate Requirement
Occupational Exposure to Asbestos	29 CFR Parts 1910 and 1926.	Establishes OSHA requirements for asbestos-related work in the construction and demolition industry. Requirements on exposure limits, work practices and engineering controls to provide worker safety in handling, removal, disposal, or other workplace exposure to asbestos.	Relevant and Appropriate Requirement

Table C–3. Action–Specific Applicable or Relevant and Appropriate Requirements. Ajax/Magnolia Mines, Oregon (continued)

Standard, Requirement Criteria, or Limitation	Citation	Description	Applicable/Relevant and Appropriate?
STATE OF OREGON			
Fugitive Dust Emissions	40 CFR Section 50.6	Establishes standards for PM-10	Applicable Requirement
Asbestos Removal	OAR 340-32-5620 through 5650	Establish ODEQ requirements for licensing and certification for asbestos workers. All workers who handle asbestos-containing materials must meet certain training, licensing and certification requirements.	Relevant and Appropriate Requirement
	OAR 340-33-010 through 100	Establish ODEQ requirements for handling asbestos-containing materials. Handling, removing, transporting and disposing of asbestos material in a manner that prevents it from becoming friable and releasing asbestos fibers.	Relevant and Appropriate Requirement

APPENDIX D

COST ESTIMATE

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
AJAX MINE - ALTERNATIVE 2: EXCAVATION AND OFF-SITE DISPOSAL					
		Bat Gates Installation			
1	ea	Bat gate, installed at Ajax adit	$1,500.00	$1,500.00	USFS experience
8	hr	Demolish existing adit structure	$182.25	$1,458.00	estimate at hourly backhoe crew rate
		Bat Gates Installation Subtotal =		**$2,958.00**	
		Backfill Collapsed Vertical Shaft near WP-13			
370	cy	Excavate material from WP-13 shaft, 1cy backhoe	$2.43	$897.81	place in stockpile
8	hr	Cut and bury timbers and metal from WP-13 shaft	$182.25	$1,458.00	estimate at hourly backhoe crew rate
80	cy	Excavate/push waste rock from WP-13 into shaft, 300hp dozer	$2.15	$172.00	
370	cy	Backfill WP-13 shaft, 1cy backhoe	$2.43	$897.81	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
20	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$83.60	obtain from meadow/repository site
20	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$56.00	
24	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$78.48	volume rounded up to whole number of trucks
20	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$56.00	estimate at excavate/load rate
1	msf	Fertilizer, 800/lb/ac	$16.88	$16.88	1,000 sf
1	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$82.50	Means+50% for USFS seed mix
1	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$67.50	Means+50% for USFS seed mix
1	cy	Mulch	$20.00	$20.00	$14-25/cy typical bulk retail cost
1	cy	Place mulch, backhoe	$182.25	$182.25	
4	hr	Spread mulch, by hand	$25.00	$100.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Backfill Vertical Shaft Subtotal =		**$4,897.82**	
		Mine Waste Excavation			
545	ea	Clear trees from WP-11, 335hp dozer, <12" dia.	$11.40	$6,215.28	assume 1 tree/10 sf
1200	cy	Excavate/load waste rock from WP-11; 1cy backhoe	$2.80	$3,360.00	
50	cy	Excavate/load red soil from near WP-11; 1cy backhoe	$2.80	$140.00	
1260	cy	Haul waste rock and red soil to stockpile, 1 mi r.t.	$3.91	$4,926.60	volume rounded up to whole number of trucks
2	wk	XRF rental	$2,530.00	$5,060.00	Ashtead Technology Rentals +10%
2	ea	Confirmation samples (total As, Mn, Pb)	$82.50	$165.00	SVL+10%
		Mine Waste Excavation Subtotal =		**$19,866.88**	
		Transportation and Disposal			
1260	cy	Load waste onto 20cy trucks, 1cy backhoe	$2.80	$3,528.00	
15120	mi	Haul waste to TSDF in 20cy truck, 240mi	$3.00	$45,360.00	
15120	mi	Fuel surcharge (estimate)	$0.20	$3,024.00	varies with fuel price
4	dy	Driver per diem	$130.00	$520.00	
4	ea	Mob/demob, per driver/truck combo, each way	$1,000.00	$4,000.00	TW Co from SLC, assume 4 trucks
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
1260	cy	TSDF tipping fee	$75.00	$94,500.00	US Ecology Grand View
		Transportation and Disposal Subtotal =		**$173,932.00**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Stream Rehabilitation			
250	lf	Reconstruct stream channel, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Excavate new stream channel, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Coir fabric for stream banks, with stakes, etc.	$10.00	$2,500.00	based on Rolanka price list +14%
250	lf	Place soil back in banks, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Sew fabric, place stakes, etc	$5.00	$1,250.00	assume 4 man-hours per 20-lf roll
3	msf	Fertilizer, 800/lb/ac	$16.88	$50.64	new banks: 12x250ft
3	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$247.50	Means+50% for USFS seed mix
3	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$202.50	Means+50% for USFS seed mix
25	ea	Place root wads in banks	$1.50	$37.50	assume 1/10lf
250	ea	Plant willows	$1.50	$375.00	assume 1/lf
185	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$773.30	obtain from meadow/repository site
185	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$518.00	
192	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$627.84	volume rounded up to whole number of trucks
185	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$518.00	10,000sf; estimate at excavate/load rate
10	msf	Fertilizer, 800/lb/ac	$16.88	$168.80	10,000 sf
10	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$825.00	Means+50% for USFS seed mix
10	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$675.00	Means+50% for USFS seed mix
36	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$100.80	
36	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$507.60	source ~2mi S of confluence
36	cy	Place riprap in ditch	$2.27	$81.72	
		Stream Rehabilitation Subtotal =		**$12,189.01**	
		Miscellaneous			
1	L.S.	Staging area prep	$5,000.00	$5,000.00	
1	L.S.	Mobilization	$10,000.00	$10,000.00	est. $50/mi from Pendleton, plus $2500 rentals
1	L.S.	Temporary erosion control	$5,000.00	$5,000.00	
1	L.S.	Aditwater management during construction	$1,000.00	$1,000.00	
		Miscellaneous Subtotal =		**$21,000.00**	
		Monitoring and Maintenance (3 year total)			
1.5	ea	site visit, inspection	$1,000.00	$1,500.00	assume annual site visits after three years for both Ajax and Magnolia
		Monitoring and Maintenance Subtotal =		**$1,500.00**	
		SUMMARY			
		Bat Gates Installation Subtotal =		$2,958	
		Backfill Vertical Shaft Subtotal =		$4,898	
		Mine Waste Excavation Subtotal =		$19,867	
		Transportation and Disposal Subtotal =		$173,932	
		Stream Rehabilitation Subtotal =		$12,189	
		Miscellaneous Subtotal =		$21,000	
		Ajax Construction Total =		**$234,844**	
		Design 20% of construction		$46,969	
		Construction Management 10% of construction		$23,484	
		Monitoring and Maintenance Subtotal =		$1,500	
		Subtotal =		**$306,797**	
		Contingency 20%		$61,359	

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		ALTERNATIVE 2 TOTAL FOR AJAX MINE =		**$368,156**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
MAGNOLIA MINE - ALTERNATIVE 2: EXCAVATION AND OFF-SITE DISPOSAL					
		Bat Gates Installation			
1	ea	Bat gate, installed at Magnolia adit	$1,500.00	$1,500.00	USFS experience
1	ea	Bat gate, installed at west adit across Lucas Gulch	$1,500.00	$1,500.00	USFS experience + 500% for access
16	hr	Demolish existing adit structures	$182.25	$2,916.00	estimate at hourly backhoe crew rate
		Bat Gates Installation Subtotal =		**$5,916.00**	
		Cabin and Debris Removal			
1800	cf	Demolish standing cabin	$0.27	$486.00	15'Lx10'Wx12'H
1800	cf	Demolish collapsed cabin	$0.27	$486.00	estimate at hourly backhoe crew rate
96	cy	Load wood and mill debris, 1cy backhoe	$2.80	$268.80	assume equivalent to 8 truckloads
96	cy	Haul wood and mill debris to stockpile at cabins, 12cy dump, 1/4mi r	$2.84	$272.64	assume equivalent to 8 truckloads
340	cy	Excavate local disposal pit, 1cy backhoe	$2.43	$825.01	assume 2x waste volume
170	cy	Place wood debris in disposal pit	$2.27	$385.90	
340	cy	Cover disposal pit, FE loader	$2.27	$771.80	
1	msf	Fertilizer, 800/lb/ac	$16.88	$16.88	1,000 sf
1	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$82.50	Means+50% for USFS seed mix
1	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$67.50	Means+50% for USFS seed mix
1	cy	Mulch	$20.00	$20.00	$14-25/cy typical bulk retail cost
1	cy	Place mulch, backhoe	$182.25	$182.25	
4	hr	Spread mulch, by hand	$25.00	$100.00	2MSF/day at 2" deep per 029-516-1900 (1996
		Cabin and Debris Removal Subtotal =		**$3,965.28**	
		Backfill Collapsed Vertical Shaft near WP-1			
1340	ea	Clear trees from roadway to WP-1, 335hp dozer, <12" dia.	$11.40	$15,276.00	assume 2 trees/lf
133	ea	Clear trees from adit/trench above WP-1, 335hp dozer, <12" dia.	$11.40	$1,516.20	estimate 30'x40'; 1 tree/sy
670	lf	Grade temporary road to WP-1, 300hp dozer	$0.77	$518.63	estimate similar to 10'Wx6"D excavation + 300ft haul
370	cy	Excavate material from WP-1 shaft, 1cy backhoe	$2.43	$897.81	place in stockpile
80	cy	Excavate/push waste rock from WP-1 into shaft, 300hp dozer	$2.15	$172.00	
370	cy	Backfill WP-1 shaft, 1cy backhoe	$2.43	$897.81	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
20	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$83.60	obtain from meadow/repository site
20	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$56.00	
24	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$78.48	volume rounded up to whole number of trucks
20	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$56.00	estimate at excavate/load rate
670	lf	Rip temporary road to WP-1, 300hp dozer	$0.77	$518.63	estimate similar to 10'Wx6"D excavation + 300ft haul
8	msf	Fertilizer, 800/lb/ac	$16.88	$135.04	1,243sf shaft area + 10ft wide road
8	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$660.00	Means+50% for USFS seed mix
8	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$540.00	Means+50% for USFS seed mix
8	cy	Mulch	$20.00	$160.00	$14-25/cy typical bulk retail cost
8	cy	Place mulch, backhoe	$182.25	$1,458.00	
32	hr	Spread mulch, by hand	$25.00	$800.00	2MSF/day at 2" deep per 029-516-1900 (1996
		Backfill Vertical Shaft Subtotal =		**$24,553.19**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Backfill Collapsed Adit Near WP-7			
1210	ea	Clear trees/brush for temporary road to WP-7, 335hp dozer	$11.40	$13,794.00	assume 2 trees/lf
333	ea	Clear trees from adit/trench above WP-7, 335hp dozer, <12" dia.	$11.40	$3,796.20	estimate 20'x150'; 1 tree/sy
605	lf	Grade temporary road to WP-7, 335hp dozer	$4.18	$2,528.90	estimate similar to 6" excavation + 300ft haul
400	cy	Excavate material along collapsed adit near WP-7, 1cy backhoe	$2.43	$970.60	12x6x150ft; place in stockpile
170	cy	Excavate/push waste rock from WP-7 into adit, 300hp dozer	$2.15	$365.50	5x6x150ft
400	cy	Backfill WP-7 adit, 1cy backhoe	$2.43	$970.60	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
60	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$250.80	obtain from meadow/repository site
60	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$168.00	
60	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$196.20	volume rounded up to whole number of trucks
60	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$168.00	20x150ft; estimate at excavate/load rate
605	lf	Rip temporary road to WP-7, 300hp dozer	$0.77	$468.31	estimate similar to 10'Wx6"D excavation + 300ft haul
10	msf	Fertilizer, 800/lb/ac	$16.88	$168.80	3578sf shaft area + 10ft wide road
10	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$825.00	Means+50% for USFS seed mix
10	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$675.00	Means+50% for USFS seed mix
10	cy	Mulch	$20.00	$200.00	$14-25/cy typical bulk retail cost
10	cy	Place mulch, backhoe	$182.25	$1,822.50	
40	hr	Spread mulch, by hand	$25.00	$1,000.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Backfill Collapsed Adits Subtotal =		**$29,097.41**	
		Mine Waste Excavation			
1264	ea	Clear trees/brush from WP-1,2,3,4,5,6,8, 335hp dozer	$11.40	$14,405.27	assume 1 tree/10 sf
1940	cy	Excavate/load waste rock from WP-1,2,3,4,5,6,8; 1cy backhoe	$2.80	$5,432.00	volume rounded up
100	cy	Excavate/load soil from near crusher, 1cy backhoe	$2.80	$280.00	1ft over 2446sf
150	cy	Excavate/load settling pond sludge; 1cy backhoe	$2.80	$420.00	1.5ft over area
2196	cy	Haul waste to stockpile, 12cy dump, 1/4 mi round trip	$2.84	$6,236.64	
526	ea	Clear trees/brush from WP-7, 335hp dozer	$11.40	$5,991.27	assume 1 tree/10 sf
860	cy	Excavate/load WP-7 waste rock; 1cy backhoe	$2.80	$2,408.00	170 cy were used in adit backfill
864	cy	Haul WP-7 waste rock to stockpile, 12cy dump, 1/2 mi r.t.	$3.27	$2,825.28	volume rounded up to whole number of trucks
4	wk	XRF rental	$2,530.00	$10,120.00	Ashtead Technology Rentals +10%
10	ea	Confirmation samples (total As, Mn, Pb)	$82.50	$825.00	SVL+10%
380	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$1,588.40	obtain from meadow/repository site
380	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$1,064.00	
84	cy	Haul stockpiled soil to WP-7, 12cy dump, 1/2mi r.t.	$3.27	$274.68	volume rounded up to whole number of trucks
300	cy	Haul stockpiled soil to other excavated areas, 12cy dump, 1/2mi r.t.	$3.27	$981.00	volume rounded up to whole number of trucks
380	cy	Place 6" soil cover, 1cy backhoe	$2.80	$1,064.00	estimate at excavate/load rate
25	msf	Fertilizer, 800/lb/ac	$16.88	$422.00	waste piles, mill, WP-7 and -1 shaft and WP-1 repository, +15%
25	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$2,062.50	Means+50% for USFS seed mix, 15% buffer zone area
25	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$1,687.50	Means+50% for USFS seed mix
25	cy	Mulch	$20.00	$500.00	$14-25/cy typical bulk retail cost
25	cy	Place mulch, backhoe	$182.25	$4,556.25	
100	hr	Spread mulch, by hand	$25.00	$2,500.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Mine Waste Excavation Subtotal =		**$51,238.52**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 2 - Excavation and Off–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Transportation and Disposal			
3060	cy	Load waste onto 20cy trucks, 1cy backhoe	$2.80	$8,568.00	volume rounded up to whole number of trucks
36720	mi	Haul waste to TSDF in 20cy truck, 240mi	$3.00	$110,160.00	
36720	mi	Fuel surcharge (estimate)	$0.20	$7,344.00	varies with fuel price
4	dy	Driver per diem	$130.00	$520.00	
4	ea	Mob/demob, per driver/truck combo, each way	$1,000.00	$4,000.00	TW Co from SLC, assume 4 trucks
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
3060	cy	TSDF tipping fee	$75.00	$229,500.00	US Ecology Grand View
		Transportation and Disposal Subtotal =		**$383,092.00**	
		Miscellaneous			
1	L.S.	Staging area prep	$5,000.00	$5,000.00	
1	L.S.	Mobilization	$10,000.00	$10,000.00	est. $50/mi from Pendleton, plus $2500 rentals
1	L.S.	Temporary erosion control	$5,000.00	$5,000.00	
1	L.S.	Aditwater management during construction	$3,000.00	$3,000.00	
		Miscellaneous Subtotal =		**$23,000.00**	
		Monitoring and Maintenance (3 year total)			
1.5	ea	site visit, inspection	$1,000.00	$1,500.00	assume annual site visits for three years for both Ajax and Magnolia
		Monitoring and Maintenance Subtotal =		**$1,500.00**	
		SUMMARY			
		Bat Gates Installation Subtotal =		$5,916	
		Cabin and Debris Removal Subtotal =		$3,965	
		Backfill Vertical Shaft Subtotal =		$24,553	
		Backfill Collapsed Adits Subtotal =		$29,097	
		Mine Waste Excavation Subtotal =		$51,239	
		Transportation and Disposal Subtotal =		$383,092	
		Miscellaneous Subtotal =		$23,000	
		Magnolia Construction Total =		**$520,862**	
		Design 20% of construction		$104,172	
		Construction Management 10% of construction		$52,086	
		Monitoring and Maintenance Subtotal =		$1,500	
		Subtotal =		**$678,621**	
		Contingency 20% of subtotal		$135,724	
		ALTERNATIVE 2 TOTAL FOR MAGNOLIA MINE =		**$814,345**	

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
AJAX MINE - ALTERNATIVE 3: EXCAVATION AND ON-SITE DISPOSAL					
		Construction			
		Bat Gates Installation			
1	ea	Bat gate, installed at Ajax adit	$1,500.00	$1,500.00	USFS experience
8	hr	Demolish existing adit structure	$182.25	$1,458.00	estimate at hourly backhoe crew rate
		Bat Gates Installation Subtotal =		**$2,958.00**	
		Backfill Collapsed Vertical Shaft Near WP-13			
370	cy	Excavate material from WP-13 shaft, 1cy backhoe	$2.43	$897.81	place in stockpile
8	hr	Cut and bury timbers and metal from WP-13 shaft	$182.25	$1,458.00	estimate at hourly backhoe crew rate
80	cy	Excavate/push waste rock from WP-13 into shaft, 300hp dozer	$2.15	$172.00	
370	cy	Backfill WP-13 shaft, 1cy backhoe	$2.43	$897.81	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
20	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$83.60	obtain from meadow/repository site
20	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$56.00	
24	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$78.48	volume rounded up to whole number of trucks
20	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$56.00	estimate at excavate/load rate
1	msf	Fertilizer, 800/lb/ac	$16.88	$16.88	1,000 sf
1	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$82.50	Means+50% for USFS seed mix
1	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$67.50	Means+50% for USFS seed mix
1	cy	Mulch	$20.00	$20.00	$14-25/cy typical bulk retail cost
1	cy	Place mulch, backhoe	$182.25	$182.25	
4	hr	Spread mulch, by hand	$25.00	$100.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Backfill Vertical Shaft Subtotal =		**$4,897.82**	
		Mine Waste Excavation and Placement			
595	ea	Clear trees/brush from WP-11, 335hp dozer, <12" dia.	$11.40	$6,785.28	assume 1 tree/10 sf
1200	cy	Excavate/load waste rock from WP-11; 1cy backhoe	$2.80	$3,360.00	
50	cy	Excavate/load red soil from near WP-11; 1cy backhoe	$2.80	$140.00	
1260	cy	Haul waste rock and red soil to stockpile, 1 mi r.t.	$3.91	$4,926.60	volume rounded up to whole number of trucks
1250	cy	Place waste in repository, FE loader	$2.27	$2,837.50	
1250	cy	Compact waste, 6" lifts, sheepsfoot	$0.57	$712.50	
2	wk	XRF rental	$2,530.00	$5,060.00	Ashtead Technology Rentals +10%
2	ea	Confirmation samples (total As, Mn, Pb)	$82.50	$165.00	SVL+10%
		Mine Waste Excavation and Placement Subtotal =		**$23,986.88**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Stream Rehabilitation			
250	lf	Reconstruct stream channel, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Excavate new stream channel, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Coir fabric for stream banks, with stakes, etc.	$10.00	$2,500.00	based on Rolanka price list +14%
250	lf	Place soil back in banks, 1cy backhoe	$3.64	$909.94	assume equiv to excavating 0.5cy/lf @ 33% productivity
250	lf	Sew fabric, place stakes, etc	$5.00	$1,250.00	assume 4 man-hours per 20-lf roll
3	msf	Fertilizer, 800/lb/ac	$16.88	$50.64	new banks: 12x250ft
3	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$247.50	Means+50% for USFS seed mix
3	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$202.50	Means+50% for USFS seed mix
25	ea	Place root wads in banks	$1.50	$37.50	assume 1/10lf
250	ea	Plant willows	$1.50	$375.00	assume 1/lf
185	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$773.30	obtain from meadow/repository site
185	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$518.00	
192	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$627.84	volume rounded up to whole number of trucks
185	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$518.00	10,000sf; estimate at excavate/load rate
10	msf	Fertilizer, 800/lb/ac	$16.88	$168.80	10,000 sf
10	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$825.00	Means+50% for USFS seed mix
10	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$675.00	Means+50% for USFS seed mix
36	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$100.80	
36	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$507.60	source ~2mi S of confluence
36	cy	Place riprap in ditch	$2.27	$81.72	
		Stream Rehabilitation Subtotal =		**$12,189.01**	
		Miscellaneous			
1	L.S.	Staging area prep	$5,000.00	$5,000.00	
1	L.S.	Mobilization	$10,000.00	$10,000.00	est. $50/mi from Pendleton, plus $2500 rentals
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
1	L.S.	Temporary erosion control	$5,000.00	$5,000.00	
1	L.S.	Aditwater management during construction	$1,000.00	$1,000.00	
		Miscellaneous Subtotal =		**$44,000.00**	
		Monitoring and Maintenance (3 year total)			
1.5	ea	site visit, inspection	$1,600.00	$2,400.00	assume annual visits for three years for both Ajax and Magnolia
24	ea	Stream water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
		Monitoring and Maintenance Subtotal =		**$9,264.00**	
		SUMMARY			
		Bat Gates Installation Subtotal =		$2,958	
		Backfill Vertical Shaft Subtotal =		$4,898	
		Mine Waste Excavation and Placement Subtotal =		$23,987	
		Share of repository construction cost allocated to Ajax (opt#1)		$50,955	
		Stream Rehabilitation Subtotal =		$12,189	
		Miscellaneous Subtotal =		$44,000	
		Ajax Construction Total		$138,986	
		Design 20% of construction		$27,797	
		Construction Management 10% of construction		$13,899	
		Monitoring and Maintenance Subtotal =		$9,264	
		Subtotal		$189,946	
		Contingency 20%		$37,989	

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		ALTERNATIVE 3 TOTAL FOR AJAX MINE (cover option 1) =		**$227,936**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		SUMMARY			
		Bat Gates Installation Subtotal =		$2,958	
		Backfill Vertical Shaft Subtotal =		$4,898	
		Mine Waste Excavation and Placement Subtotal =		$23,987	
		Share of repository construction cost allocated to Ajax (opt#1)		$29,424	
		Stream Rehabilitation Subtotal =		$12,189	
		Miscellaneous Subtotal =		$44,000	
		Ajax Construction Total		$117,456	
		Design 20% of construction		$23,491	
		Construction Management 10% of construction		$11,746	
		Monitoring and Maintenance Subtotal =		$9,264	
		Subtotal		$161,956	
		Contingency 20%		$32,391	
		ALTERNATIVE 3 TOTAL FOR AJAX MINE (cover option 2) =		**$194,348**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
MAGNOLIA MINE - ALTERNATIVE 3: EXCAVATION AND ON-STE DISPOSAL					
		Construction			
		Bat Gates Installation			
1	ea	Bat gate, installed at Magnolia adit	$1,500.00	$1,500.00	USFS experience
1	ea	Bat gate, installed at west adit across Lucas Gulch	$1,500.00	$1,500.00	USFS experience + 500% for access
16	hr	Demolish existing adit structures	$182.25	$2,916.00	estimate at hourly backhoe crew rate
		Bat Gates Installation Subtotal =		**$5,916.00**	
		Cabin and Debris Removal			
1800	cf	Demolish standing cabin	$0.27	$486.00	15'Lx10'Wx12'H
1800	cf	Demolish collapsed cabin	$0.27	$486.00	estimate at hourly backhoe crew rate
96	cy	Load mill and wood debris, 1cy backhoe	$2.80	$268.80	assume equivalent to 8 truckloads
96	cy	Haul mill and wood debris to stockpile at cabins, 12cy dump, 1/4mi r.t.	$2.84	$272.64	assume equivalent to 8 truckloads
340	cy	Excavate local disposal pit, 1cy backhoe	$2.43	$825.01	assume 2x waste volume
170	cy	Place wood debris in disposal pit	$2.27	$385.90	
340	cy	Cover disposal pit, FE loader	$2.27	$771.80	
1	msf	Fertilizer, 800/lb/ac	$16.88	$16.88	1,000 sf
1	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$82.50	Means+50% for USFS seed mix
1	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$67.50	Means+50% for USFS seed mix
1	cy	Mulch	$20.00	$20.00	$14-25/cy typical bulk retail cost
1	cy	Place mulch, backhoe	$182.25	$182.25	
4	hr	Spread mulch, by hand	$25.00	$100.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Cabin and Debris Removal Subtotal =		**$3,965.28**	
		Backfill Collapsed Vertical Shaft Near WP-1			
1340	ea	Clear trees from roadway to WP-1, 335hp dozer, <12" dia.	$11.40	$15,276.00	assume 2 trees/lf
133	ea	Clear trees from adit/trench above WP-1, 335hp dozer, <12" dia.	$11.40	$1,516.20	estimate 30'x40'; 1 tree/sy
670	lf	Grade temporary road to WP-1, 300hp dozer	$0.77	$518.63	estimate similar to 10'Wx6"D excavation + 300ft haul
370	cy	Excavate material from WP-1 shaft, 1cy backhoe	$2.43	$897.81	place in stockpile
80	cy	Excavate/push waste rock from WP-1 into shaft, 300hp dozer	$2.15	$172.00	
370	cy	Backfill WP-1 shaft, 1cy backhoe	$2.43	$897.81	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
20	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$83.60	obtain from meadow/repository site
20	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$56.00	
24	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$78.48	volume rounded up to whole number of trucks
20	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$56.00	estimate at excavate/load rate
670	lf	Rip temporary road to WP-1, 300hp dozer	$0.77	$518.63	estimate similar to 10'Wx6"D excavation + 300ft haul
8	msf	Fertilizer, 800/lb/ac	$16.88	$135.04	1,243sf shaft area + 10ft wide road
8	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$660.00	Means+50% for USFS seed mix
8	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$540.00	Means+50% for USFS seed mix
8	cy	Mulch	$20.00	$160.00	$14-25/cy typical bulk retail cost
8	cy	Place mulch, backhoe	$182.25	$1,458.00	
32	hr	Spread mulch, by hand	$25.00	$800.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Backfill Vertical Shaft Subtotal =		**$24,553.19**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Backfill Collapsed Adit Near WP-7			
1210	ea	Clear trees/brush for temporary road to WP-7, 335hp dozer <12" dia.	$11.40	$13,794.00	assume 2 trees/lf
333	ea	Clear trees from adit/trench above WP-7, 335hp dozer, <12" dia.	$11.40	$3,796.20	estimate 20'x150'; 1 tree/sy
605	lf	Grade temporary road to WP-7, 335hp dozer	$4.18	$2,528.90	estimate similar to 6" excavation + 300ft haul
400	cy	Excavate material along collapsed adit near WP-7, 1cy backhoe	$2.43	$970.60	12x6x150ft; place in stockpile
170	cy	Excavate/push waste rock from WP-7 into adit, 300hp dozer	$2.15	$365.50	5x6x150ft
400	cy	Backfill WP-7 adit, 1cy backhoe	$2.43	$970.60	transfer from stockpile
2	hr	Grade/contour to drain	$182.25	$364.50	
2	hr	Compact backfill by tamping, 1cy backhoe	$182.25	$364.50	
60	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$250.80	obtain from meadow/repository site
60	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$168.00	
60	cy	Haul stockpiled soil, 12cy dump, 1/2mi r.t.	$3.27	$196.20	volume rounded up to whole number of trucks
60	cy	Place 6" soil cover on excavated waste area, 1cy backhoe	$2.80	$168.00	20x150ft; estimate at excavate/load rate
605	lf	Rip temporary road to WP-7, 300hp dozer	$0.77	$468.31	estimate similar to 10'Wx6"D excavation + 300ft haul
10	msf	Fertilizer, 800/lb/ac	$16.88	$168.80	3578sf shaft area + 10ft wide road
10	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$825.00	Means+50% for USFS seed mix
10	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$675.00	Means+50% for USFS seed mix
10	cy	Mulch	$20.00	$200.00	$14-25/cy typical bulk retail cost
10	cy	Place mulch, backhoe	$182.25	$1,822.50	
40	hr	Spread mulch, by hand	$25.00	$1,000.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Backfill Collapsed Adits Subtotal =		**$29,097.41**	
		Mine Waste Excavation and Placement			
1264	ea	Clear trees/brush from WP-1,2,3,4,5,6,8; 335hp dozer <12" dia.	$11.40	$14,405.27	assume 1 tree/10 sf
1940	cy	Excavate/load waste rock from WP-1,2,3,4,5,6,8; 1cy backhoe	$2.80	$5,432.00	volume rounded up
100	cy	Excavate/load soil from near crusher, 1cy backhoe	$2.80	$280.00	1ft over 2446sf
150	cy	Excavate/load settling pond sludge; 1cy backhoe	$2.80	$420.00	1.5ft over area
2196	cy	Haul waste to repository, 12cy dump, 1/4 mi round trip	$2.84	$6,236.64	volume rounded up to whole number of trucks
2190	cy	Place waste in repository, FE loader	$2.27	$4,971.30	
2190	cy	Compact waste, 6" lifts, sheepsfoot	$0.57	$1,248.30	
526	ea	Clear trees/brush from WP-1,2,3,4,5,6,8; 335hp dozer <12" dia.	$11.40	$5,991.27	assume 1 tree/10 sf
860	cy	Excavate/load WP-7 waste rock; 1cy backhoe	$2.80	$2,408.00	170cy were used in adit backfill
864	cy	Haul WP-7 waste rock to repository, 12cy dump, 1/2 mi r.t.	$3.27	$2,825.28	volume rounded up to whole number of trucks
860	cy	Place waste in repository, FE loader	$2.27	$1,952.20	
860	cy	Compact waste, 6" lifts, sheepsfoot	$0.57	$490.20	
4	wk	XRF rental	$2,530.00	$10,120.00	Ashtead Technology Rentals +10%
10	ea	Confirmation samples (total As, Mn, Pb)	$82.50	$825.00	SVL+10%
380	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$1,588.40	obtain from meadow/repository site
380	cy	Load stockpiled soil into truck, 1cy backhoe	$2.80	$1,064.00	
84	cy	Haul stockpiled soil to WP-7, 12cy dump, 1/2mi r.t.	$3.27	$274.68	volume rounded up to whole number of trucks
300	cy	Haul stockpiled soil to other excavated areas, 12cy dump, 1/2mi r.t.	$3.27	$981.00	volume rounded up to whole number of trucks
380	cy	Place 1ft soil cover, 1cy backhoe	$2.80	$1,064.00	estimate at excavate/load rate
25	msf	Fertilizer, 800/lb/ac	$16.88	$422.00	waste piles, mill, WP-7 and -1 shaft and WP-1 repository, +15%
25	msf	Seeding, slope mix, 6lb/MSF, push spreader	$82.50	$2,062.50	Means+50% for USFS seed mix
25	msf	Seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$1,687.50	Means+50% for USFS seed mix
25	cy	Mulch	$20.00	$500.00	$14-25/cy typical bulk retail cost
25	cy	Place mulch, backhoe	$182.25	$4,556.25	
100	hr	Spread mulch, by hand	$25.00	$2,500.00	2MSF/day at 2" deep per 029-516-1900 (1996)
		Mine Waste Excavation and Placement Subtotal =		**$59,900.52**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Construct Repository at Magnolia Meadow			
		Common items			
410	lf	Cut drainage ditch, 30"Wx1'D	$1.00	$410.00	assume 1200 lf/ day for Means crew instead of 6000lf/day
4	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$11.20	assume 10'x10'x1'
12	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$169.20	source ~2mi S of confluence; round up to nearest truckload
4	cy	Place riprap in ditch outlet	$2.27	$9.08	
1665	ea	Clear trees from repository and stockpile areas, 335hp dozer, <12" dia.	$11.40	$18,981.00	assume 1tree/4sf over 1/4 of footprint
		Cover option 1: polypropylene liner			
2570	cy	Excavate/stockpile topsoil, 300hp dozer, 300'haul	$4.18	$10,742.60	assume 2'Dx(26,645sf+800' perimeter 10'W)
500	cy	Compact bottom of repository, 6" lift, sheepsfoot	$0.57	$285.00	one lift on 26645sf
1000	cy	Screen <3/4" dia. from topsoil for drainage layer on geomembrane	$5.00	$5,000.00	70% passed #4 screen, but assume 50% yield
500	cy	Place coarse <3/4" dia. in 6" drainage layer	$2.27	$1,135.00	6"Dx26,645sf
2000	cy	Screen fines from topsoil for drainage layer on geomembrane	$5.00	$10,000.00	70% passed #4 screen, but assume 50% yield
1000	cy	Place fines in 1' bedding layer under geomembrane	$2.27	$2,270.00	1'Dx26,645sf
41570	sf	45mil liner, installed (assume 20% waste/selvage)	$1.00	$41,556.70	Serrot Oct2001 + 42%
4620	sy	Filter fabric, 8oz non-woven (assume 20% waste/selvage)	$1.28	$5,904.36	Specialty Construction Supply 2001 +42%
8	hr	Install filter fabric over drainage layer	$182.25	$1,458.00	hourly for backhoe crew
2570	cy	Excavate/load topsoil from stockpile, 1cy backhoe	$2.80	$7,196.00	assume 2'Dx(26,645sf+800' perimeter 10'W) +18% bulking
2570	cy	Compact topsoil, 6" lifts, sheepsfoot	$0.57	$1,464.90	
35	msf	Fertilizer, 800/lb/ac	$16.88	$590.80	26,645sf+800' perimeter 10'W
35	msf	Repository seeding, slope mix, 6lb/MSF, push spreader	$82.50	$2,887.50	Means+50% for USFS seed mix
35	msf	Repository seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$2,362.50	Means+50% for USFS seed mix
35	cy	Mulch	$20.00	$700.00	$14-25/cy typical bulk retail cost
35	cy	Place mulch, backhoe	$182.25	$6,378.75	
140	hr	Spread mulch, by hand	$25.00	$3,500.00	2MSF/day at 2" deep per 029-516-1900 (1996)
24	hr	Place cut trees on soil	$182.25	$4,374.00	hourly for backhoe
		Construct Repository with Cover Option 1 Subtotal =		$127,386.59	
		Cover option 2: soil cover			
2570	cy	Excavate/stockpile topsoil, 300hp dozer, 300'haul	$4.18	$10,742.60	assume 2'Dx(26,645sf+800' perimeter 10'W)
500	cy	Compact bottom of repository, 6" lift, sheepsfoot	$0.57	$285.00	one lift on 26645sf
1000	cy	Screen <3/4" dia. from topsoil for capillary break	$5.00	$5,000.00	70% passed #4 screen, but assume 50% yield
500	cy	Place coarse <3/4" dia. in 6" capillary break	$2.27	$1,135.00	6"Dx26,645sf
4620	sy	Filter fabric, 8oz non-woven (assume 20% waste/selvage)	$1.28	$5,904.36	Specialty Construction Supply 2001 +42%
8	hr	Install filter fabric over capillary break	$182.25	$1,458.00	hourly for backhoe crew
2570	cy	Excavate/load topsoil from stockpile, 1cy backhoe	$2.80	$7,196.00	assume 2'Dx(26,645sf+800' perimeter 10'W) +18% bulking
2570	cy	Compact topsoil, 6" lifts, sheepsfoot	$0.57	$1,464.90	
35	msf	Fertilizer, 800/lb/ac	$16.88	$590.80	26,645sf+800' perimeter 10'W
35	msf	Repository seeding, slope mix, 6lb/MSF, push spreader	$82.50	$2,887.50	Means+50% for USFS seed mix
35	msf	Repository seeding, wildflowers, 0.6lb/MSF, push spreader	$67.50	$2,362.50	Means+50% for USFS seed mix
35	cy	Mulch	$20.00	$700.00	$14-25/cy typical bulk retail cost
35	cy	Place mulch, backhoe	$182.25	$6,378.75	
140	hr	Spread mulch, by hand	$25.00	$3,500.00	2MSF/day at 2" deep per 029-516-1900 (1996)
24	hr	Place cut trees on soil	$182.25	$4,374.00	hourly for backhoe crew
		Construct Repository with Cover Option 2 Subtotal =		$73,559.89	
3050	cy	Waste rock and sludge from Magnolia to repository			
1250	cy	Waste rock and sludge from Ajax to repository			
81%		Share of repository construction cost allocated to Magnolia (opt#1)		**$103,183.14**	added 10%, in case Ajax not done
81%		Share of repository construction cost allocated to Magnolia (opt#2)		**$59,583.51**	added 10%, in case Ajax not done
40%		Share of repository construction cost allocated to Ajax (opt#1)		**$50,954.64**	added 10%, in case Magnolia not done
40%		Share of repository construction cost allocated to Ajax (opt#2)		**$29,423.96**	added 10%, in case Magnolia not done

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
Alternative 3- Excavation and On–Site Disposal

Qty	Unit	Description	Unit Cost	Cost	Comment
		Miscellaneous			
1	L.S.	Staging area prep	$5,000.00	$5,000.00	
1	L.S.	Mobilization	$10,000.00	$10,000.00	est. $50/mi from Pendleton, plus $2500 rentals
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
1	L.S.	Temporary erosion control	$5,000.00	$5,000.00	
1	L.S.	Aditwater management during construction	$3,000.00	$3,000.00	
		Miscellaneous Subtotal =		**$46,000.00**	
		Monitoring and Maintenance (3 year total)			
1.5	ea	site visit, inspection	$1,600.00	$2,400.00	assume annual visits for three years for both Ajax and Magnolia
24	ea	Stream water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
		Monitoring and Maintenance Subtotal =		**$9,264.00**	

SUMMARY	
Bat Gates Installation Subtotal =	$5,916
Cabin and Debris Removal Subtotal =	$3,965
Backfill Vertical Shaft Subtotal =	$24,553
Backfill Collapsed Adits Subtotal =	$29,097
Mine Waste Excavation and Placement Subtotal =	$59,901
Share of repository construction cost allocated to Magnolia (opt#1)	$103,183
Miscellaneous Subtotal =	$46,000
Magnolia Construction Total	$272,616
Design 20% of construction	$54,523
Construction Management 10% of construction	$27,262
Monitoring and Maintenance Subtotal =	$9,264
Subtotal	$363,664
Contingency 20% of subtotal	$72,733
ALTERNATIVE 3 TOTAL FOR MAGNOLIA MINE (cover option 1)=	**$436,397**

SUMMARY	
Bat Gates Installation Subtotal =	$5,916
Cabin and Debris Removal Subtotal =	$3,965
Backfill Vertical Shaft Subtotal =	$24,553
Backfill Collapsed Adits Subtotal =	$29,097
Mine Waste Excavation and Placement Subtotal =	$59,901
Share of repository construction cost allocated to Magnolia (opt#1)	$59,584
Miscellaneous Subtotal =	$46,000
Magnolia Construction Total	$229,016
Design 20% of construction	$45,803
Construction Management 10% of construction	$22,902
Monitoring and Maintenance Subtotal =	$9,264
Subtotal	$306,985
Contingency 20% of subtotal	$61,397
ALTERNATIVE 3 TOTAL FOR MAGNOLIA MINE (cover option 2) =	**$368,382**

Cost Estimate for Ajax/Magnolia Mines
Alternative 4 - Adit Discharge Treatment

Qty	Unit	Description	Unit Cost	Cost	Comment
AJAX MINE - ALTERNATIVE 4: ADIT DISCHARGE TREATMENT					
		Sediment Pond Construction			
30	lf	Excavate inlet culvert trench, 1cy backhoe	$1.00	$30.00	30"Wx3'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
30	lf	Place drain pipe, 8", corrugated double-walled HDPE	$7.62	$228.69	027-168-2040 (1996) +50%
9	cy	Backfill inlet culvert trench 1cy backhoe	$2.80	$25.20	
1	hr	Compact trench by tamping, 1cy backhoe	$182.25	$182.25	
25	cy	Excavate pond, 1cy backhoe	$2.43	$60.66	assume balanced cut/fill, so ½ of pond volume
1	hr	Compact pond bottom by tamping, 1cy backhoe	$182.25	$182.25	
32	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$133.76	obtain from meadow/repository site; 50% yield so 2X volume
32	cy	Screen fines from topsoil for liner bedding	$5.00	$160.00	70% passed #4 screen, but assume 50% yield
16	cy	Load fines into truck, 1cy backhoe	$2.80	$44.80	
24	cy	Haul fines, 12cy dump, 1/2mi r.t.	$3.27	$78.48	volume rounded up to whole number of trucks
16	cy	Place fines in 6" bedding layer under liner	$2.27	$36.32	
1152	sf	45mil liner, installed (assume 20% waste/selvage)	$1.00	$1,152.00	Serrot Oct2001 + 42%; 24'x40' to include anchor + 20%
140	lf	Excavate diversion channel	$1.00	$140.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
30	lf	Excavate outlet channel	$1.00	$30.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
23	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$64.40	
24	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$338.40	source ~2mi S of confluence; vol. rounded to whole number of trucks
8	cy	Place riprap in diversion & outlet channels, 1cy backhoe	$2.27	$18.16	
15	cy	Place riprap along pond berm	$2.27	$34.05	assume 400sf x 1'
1	L.S.	Staging area prep	$1,000.00	$1,000.00	assume temporary bridge already in place
1	L.S.	Mobilization	$5,000.00	$5,000.00	est. $50/mi from Pendleton, plus $2500 rentals
		Sediment Pond Construction Subtotal =		**$8,939.42**	
		Sediment Pond Monitoring and Maintenance (3 year total)			
3	ea	Site visit, twice/year; flow measurements; inspection	$1,200.00	$3,600.00	Twice a year for 3 years for both Ajax and Magnolia
24	ea	Water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
3/10	ea	Excavate pond sludge and dispose of in repository	$5,000.00	$1,500.00	estimate 8cy/10yr
		Sediment Pond Monitoring/Maintenance Subtotal =		**$11,964.00**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 4 - Adit Discharge Treatment

Qty	Unit	Description	Unit Cost	Cost	Comment
		Aerobic Wetland Construction			
34	lf	Excavate inlet culvert trench, 1cy backhoe	$1.00	$34.00	30"Wx3'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
34	lf	Place drain pipe, 12", corrugated double-walled HDPE	$7.62	$259.18	027-168-2040 (1996) +50%
10	cy	Backfill inlet culvert trench 1cy backhoe	$2.80	$28.00	
1	hr	Compact trench by tamping, 1cy backhoe	$182.25	$182.25	
37	cy	Excavate wetland, 1cy backhoe	$2.43	$89.78	assume balanced cut/fill, so ½ of wetland volume
2	hr	Compact wetland bottom by tires, 1cy backhoe	$182.25	$364.50	
34	cy	Load sand into truck, 1cy backhoe	$2.80	$95.20	
36	cy	Purchase and haul sand, 12cy dump, 120mi r.t.	$22.72	$817.92	3hr/load; rounded to whole number of trucks
34	cy	Place 6" sand bedding layer under liner, FE loader	$2.27	$77.18	
1555	sf	45mil liner, installed (assume 20% waste/selvage)	$1.00	$1,555.20	Serrot Oct2001 + 42%; 54'x24' to include anchor+ 20%
67	cy	Load compost into truck, 1cy backhoe	$2.80	$186.48	
72	cy	Purchase and haul compost, 12cy dump, 120mi r.t.	$25.72	$1,852.11	3hr/load; rounded to whole number of trucks
67	cy	Place compost in wetland, FE loader	$2.27	$151.18	
7	cy	Load gravel into truck, 1cy backhoe	$2.80	$20.72	
12	cy	Purchase and haul gravel, 12cy dump, 120mi r.t.	$25.72	$308.68	3hr/load; rounded to whole number of trucks
7	cy	Place gravel in wetland, FE loader	$2.27	$16.80	assume 10% gravel and 90% compost mixture by volume
74	cy	Mix gravel and compost in wetland, 1cy backhoe	$2.43	$179.56	use rate for excavation
44	lf	Extend diversion channel	$1.00	$44.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
30	lf	Excavate outlet channel	$1.00	$30.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
23	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$64.40	
24	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$338.40	source ~2mi S of confluence; vol. rounded to whole number of trucks
8	cy	Place riprap in diversion & outlet channels, 1cy backhoe	$2.27	$18.16	
15	cy	Place riprap along wetland berm	$2.27	$34.05	assume 400sf x 1'
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
1	L.S.	Staging area prep	$2,000.00	$2,000.00	
1	L.S.	Mobilization	$5,000.00	$5,000.00	est. $50/mi from Pendleton, plus $2500 rentals
		Aerobic Wetland Construction Subtotal =		**$36,747.75**	
		Wetland Monitoring and Maintenance (3 year portion)			
24	ea	Water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
3/20	ea	Replace wetlands substrate with fresh organic material (20yr)	$18,400.00	$2,760.00	assume 50% of construction cost
3/20	ea	On-site disposal of used substrate (20yr)	$5,000.00	$750.00	
		Wetland Monitoring/Maintenance Subtotal =		**$10,374.00**	
		SEDIMENT POND SUMMARY			
		Sediment Pond Construction Subtotal =		$8,939	
		Design 20% of construction		$1,788	
		Construction Management 10% of construction		$894	
		Sediment Pond Monitoring/Maintenance Subtotal =		$11,964	
		ALTERNATIVE 4 SEDIMENT POND TOTAL FOR AJAX MINE =		**$23,585**	
		WETLAND SUMMARY			
		Aerobic Wetland Construction Subtotal =		$36,748	
		Design 20% of construction		$7,350	
		Construction Management 10% of construction		$3,675	
		Wetland Monitoring/Maintenance Subtotal =		$10,374	
		ALTERNATIVE 4 AEROBIC WETLAND TOTAL FOR AJAX MINE =		**$58,146**	

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
Alternative 4 - Adit Discharge Treatment

Qty	Unit	Description	Unit Cost	Cost	Comment
MAGNOLIA MINE - ALTERNATIVE 4: ADIT DISCHARGE TREATMENT					
		Sediment Pond Construction			
14	cy	Excavate inlet culvert trench, 1cy backhoe	$1.00	$14.00	30"Wx2'D
14	lf	Place drain pipe, 8", corrugated double-walled HDPE	$7.62	$106.72	027-168-2040 (1996) +50%
14	cy	Backfill inlet culvert trench 1cy backhoe	$2.80	$39.20	
1	hr	Compact trench by tamping, 1cy backhoe	$182.25	$182.25	
100	cy	Excavate pond, 1cy backhoe	$2.43	$242.65	assume balanced cut/fill, so ½ of pond volume
2	hr	Compact pond bottom by tires, 1cy backhoe	$182.25	$364.50	
102	cy	Excavate/stockpile topsoil from meadow, 300hp dozer, 300'haul	$4.18	$426.36	obtain from meadow/repository site; 50% yield so 2X volume
102	cy	Screen fines from topsoil for liner bedding	$5.00	$510.00	70% passed #4 screen, but assume 50% yield
51	cy	Load fines into truck, 1cy backhoe	$2.80	$142.80	
60	cy	Haul fines, 12cy dump, 1/2mi r.t.	$3.27	$196.20	volume rounded up to whole number of trucks
51	cy	Place fines in 6" bedding layer under liner	$2.27	$115.77	
3360	sf	45mil polypropylene liner, installed (assume 20% waste/selvage)	$1.00	$3,360.00	Serrot Oct2001 + 42%; 2800 sf includes anchor + 20%
450	lf	Excavate diversion channels	$1.00	$450.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
27	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$75.60	
36	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$507.60	source ~2mi S of confluence; vol. rounded to whole number of trucks
12	cy	Place riprap at channel outlets	$2.27	$27.24	10'x10'x1', 3 outlets
1	L.S.	Staging area prep	$1,000.00	$1,000.00	assume temporary bridge already in place
1	L.S.	Mobilization	$5,000.00	$5,000.00	est. $50/mi from Pendleton, plus $2500 rentals
		Sediment Pond Construction Subtotal =		**$12,760.89**	
		Aerobic Wetland Construction			
34	lf	Excavate inlet culvert trench, 1cy backhoe	$1.00	$34.00	30"Wx3'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
34	lf	Place drain pipe, 12", corrugated double-walled HDPE	$7.62	$259.18	027-168-2040 (1996) +50%
10	cy	Backfill inlet culvert trench 1cy backhoe	$2.80	$28.00	
1	hr	Compact trench by tamping, 1cy backhoe	$182.25	$182.25	
150	cy	Excavate wetland, 1cy backhoe	$2.43	$363.98	assume balanced cut/fill, so ½ of wetland volume
3	hr	Compact wetland bottom by tires, 1cy backhoe	$182.25	$546.75	
74	cy	Load sand into truck, 1cy backhoe	$2.80	$207.20	
84	cy	Purchase and haul sand, 12cy dump, 120mi r.t.	$22.72	$1,908.48	3hr/load; rounded to whole number of trucks
74	cy	Place 6" sand bedding layer under liner, FE loader	$2.27	$167.98	
6989	sf	45mil liner, installed (assume 20% waste/selvage)	$1.00	$6,988.80	Serrot Oct2001 + 42%; 28'x208' + 20%
266	cy	Load compost into truck, 1cy backhoe	$2.80	$745.92	
276	cy	Haul compost, 12cy dump, 120mi r.t.	$25.72	$7,099.74	3hr/load; rounded to whole number of trucks
266	cy	Place compost in wetland, FE loader	$2.27	$604.73	
30	cy	Load gravel into truck, 1cy backhoe	$2.80	$82.88	
36	cy	Haul gravel, 12cy dump, 120mi r.t.	$25.72	$926.05	3hr/load; rounded to whole number of trucks
30	cy	Place gravel in wetland, FE loader	$2.27	$67.19	assume 10% of substrate by volume
296	cy	Mix gravel and compost in wetland, 1cy backhoe	$2.43	$718.24	use rate for excavation
40	lf	Extend diversion channel	$1.00	$40.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
100	lf	Excavate outlet channel	$1.00	$100.00	30"Wx2'D; assume 1200 lf/ day for Means crew instead of 6000lf/day
23	cy	Excavate/load riprap from Granite Ck, 1cy backhoe	$2.80	$64.40	
24	cy	Haul riprap from Granite Ck, 12cy dump, 10mi r.t.	$14.10	$338.40	source ~2mi S of confluence; vol. rounded to whole number of trucks
8	cy	Place riprap in diversion & outlet channels, 1cy backhoe	$2.27	$18.16	
15	cy	Place riprap along wetland berm	$2.27	$34.05	400sfx1'
1	ea	Mobilize/demobilize portable bridge	$20,000.00	$20,000.00	rough estimate
1	ea	Place/remove portable bridge on Granite Creek	$3,000.00	$3,000.00	rough estimate
1	L.S.	Staging area prep	$2,000.00	$2,000.00	
1	L.S.	Mobilization	$5,000.00	$5,000.00	est. $50/mi from Pendleton, plus $2500 rentals

Cost Estimate for Ajax/Magnolia Mines
Alternative 4 - Adit Discharge Treatment

Qty	Unit	Description	Unit Cost	Cost	Comment
		Aerobic Wetland Construction Subtotal =		**$51,526.38**	

Cost Estimate for Ajax/Magnolia Mines
Alternative 4 - Adit Discharge Treatment

Qty	Unit	Description	Unit Cost	Cost	Comment
		Sediment Pond Monitoring and Maintenance (3 year total)			
6	day	Site visit, twice/year; flow measurements	$1,200.00	$7,200.00	
24	ea	Water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
3/10	ea	Excavate pond sludge and dispose of in repository	$10,000.00	$3,000.00	estimate 32cy/10yr
		Sediment Pond Monitoring/Maintenance Subtotal =		**$17,064.00**	
		Wetland Monitoring and Maintenance (3 year portion)			
24	ea	Water analysis: TALM (incl. MS/MSD alternate events)	$286.00	$6,864.00	totals only, SVL+10%
3/20	ea	Replace wetlands substrate with fresh organic material (20yr)	$8,600.00	$1,290.00	assume 50% of construction cost
3/20	ea	On-site disposal of used substrate (20yr)	$5,000.00	$750.00	
		Wetland Monitoring/Maintentance Subtotal =		**$8,904.00**	
		SEDIMENT POND SUMMARY			
		Sediment Pond Construction Subtotal =		$12,761	
		Design 20% of construction		$2,552	
		Construction Management 10% of construction		$1,276	
		Sediment Pond Monitoring/Maintenance Subtotal =		$17,064	
		ALTERNATIVE 4 SEDIMENT POND TOTAL FOR MAGNOLIA MINE =		**$33,653**	
		AEROBIC WETLAND SUMMARY			
		Aerobic Wetland Construction Subtotal =		$51,526	
		Design 20% of construction		$10,305	
		Construction Management 10% of construction		$5,153	
		Wetland Monitoring/Maintentance Subtotal =		$8,904	
		ALTERNATIVE 4 AEROBIC WETLAND TOTAL FOR MAGNOLIA MINE =		**$75,888**	

4Q2004 Data for Pendleton, Oregon, from R.S. Means CostWorks, unless otherwise noted

Cost Estimate for Ajax/Magnolia Mines
SUMMARY

Alternative	Cost Ajax	Cost Magnolia	TOTAL
ALTERNATIVES EVALUATED:			
1 No Action	$ -	$ -	$ -
2 Excavation and Off-site Disposal	$ 368,156	$ 814,345	$ 1,182,502
3 Excavation and On-site Disposal			
Repository Cover Option 1 - Engineered Cover	$ 227,936	$ 436,397	$ 664,333
Repository Cover Option 2 - Soil Cover	$ 194,348	$ 368,382	$ 562,729
4 Adit Discharge Treatment			
Sediment Pond	$ 23,585	$ 33,653	$ 57,238
Aerobic Wetland	$ 58,146	$ 75,888	$ 134,034
PREFERRED ALTERNATIVE:			
3 Excavation and On-site Disposal			
Repository Cover Option 2 - Soil Cover	$ 194,348	$ 368,382	$ 562,729
4 Adit Discharge Treatment			
Sediment Pond	$ 23,585	$ 33,653	$ 57,238
TOTAL ESTIMATED COST FOR PREFERRED ALTERNATIVE =	**$ 217,933**	**$ 402,035**	**$ 619,968**

ABBREVIATED PRELIMINARY ASSESSMENT

AJAX MINE



Umatilla National Forest
Grant County, Oregon

December 2002

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APPENDICES

Appendix A Abbreviated Preliminary Assessment Checklist
Appendix B Additional Site Photos

EXECUTIVE SUMMARY

The Forest Service performed an Abbreviated Preliminary Assessment for the Ajax Mine (Site) to determine the need for further site characterization. The Site waste pile is placed on moderate side slopes and is located in the riparian area of Lucas Gulch. A Niton XRF unit was used for In Situ field screening of the waste pile for any potential contaminants. Water and sediment samples were not collected.

Two elements exceeded EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil. The elements were iron and arsenic. It is apparent material is moving into Lucas Gulch from erosion forces.

Based on the proximity of the Site to Lucas Gulch, it is recommended a Site Inspection (SI) be performed.

1.0 INTRODUCTION

An Abbreviated Preliminary Assessment (APA) was performed by the US Forest Service in accordance with the EPA "Guidance for Performing Preliminary Assessments Under CERCLA", EPA "Improving Site Assessment: Abbreviated Preliminary Assessments" of 1999, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Contingency Plan as outlined in 40 CFR Parts 300.410(c)(1)(i-v).

The purpose of this assessment was to determine whether or not there is a potential for a release of contaminants to the environment and/or to human health. The purpose of an APA is to determine whether further site characterization is warranted. A Niton XRF 700 Series was utilized to help in the preliminary screening of this Site.

2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

The Ajax Mine (Site) is located approximately 3.0 miles north of Granite, OR, on County Road 73. The legal description for the Site is; Latitude: 44° 51' 25"N, Longitude: 118° 24' 16"W, Sec 22, T 8 S, R 35.5 E, USGS Quadrangle Map - Granite. The Site is situated on moderate to steep hillsides adjacent to Lucas Gulch. The Site is located in the mining district of Granite.

The Site consists of one adit with water discharge coming from the adit, crossing an old Forest Service road and draining into a settling pond on top of waste rock material. Seeps were observed at the toe of the waste rock and evidence suggesting that these seeps increase in flow during spring snowmelt as there was staining of the soil going into the small stream in Lucas Gulch. The Site consists of a waste pile with a settling pond built on top of the waste pile. The waste pile is situated on top of relatively flat to moderate side slopes and in the riparian zone of Lucas Gulch. There are no structures, other than the adit, in the area. Accessing the site is easily accomplished via way of the old Forest Service road. Approximately one acre is disturbed on the Site.

There is limited historical data available on this mine. It appears this mine was developed in the early 1900s, and consisted of five short adits of which the longest one had 500 feet of drift on the Ajax vein. At one time, a five-stamp mill was on the property. A shoot 90 feet long in the Ajax vein produced $40,000 in gold and silver during 1905-1906.

In 1996, EPA reported elevated arsenic (700 ppm) and mercury (1.6 ppm) in sediments in Lucas Gulch. The arsenic and mercury concentrations in the adit discharge were reportedly lower than what was in Lucas Gulch suggesting the bulk of the contamination might be from the Magnolia mine, which is further upstream. Lucas Gulch drains into Granite Creek, which is considered critical habitat for Chinook salmon.

3.0 SITE SAMPLING AND TEST RESULTS

A Niton XRF, XL-722S was used to assess the waste piles for potential contamination. In Situ testing was performed on the Site per EPA Method 6200. Surface soils were removed to approximately 4 to 6 inches below grade in order to get below highly oxidized surface layers. Rocks, debris and other deleterious materials were removed. The soil was worked to gain a flat surface area on which to set the Niton.

No surface water, sediment, or adit discharge samples were collected and analyzed.

The following constituents exceeded EPA Region IX PRG industrial levels:

Location	Constituent	Result (mg/kg)	PRG (mg/kg)
Toe of Waste in Riparian Zone	Iron	385,840	100,000
	Arsenic	420	2.7*
Top of waste Pile	Arsenic	355	2.7
Background Readings	Iron	31,390	100,000
	Arsenic	42	2.7**

*Arsenic Industrial PRG is 2.7 mg/kg for cancer end point and 440 mg/kg for noncancer endpoints.
** Even though background concentrations are higher than for cancer endpoints, an actual removal effort would only be done to background levels. Additional sampling is required to determine the exact background level.

It is apparent that material from the waste pile is entering Lucas Gulch. It is not clear whether subsurface seepage from the waste pile is occurring and thus creating a contaminated groundwater plume, which would also enter Lucas Gulch. The ramification from this material entering an aquatic environment is unknown at this time.

4.0 SUMMARY

The waste pile lies in the riparian zone of Lucas Gulch. It was apparent erosion forces are contributing some material to Lucas Gulch.

The constituents of concern that exceeded EPA Region IX industrial levels in soil were iron and arsenic. At this time, it is unclear as to any impacts to the aquatic environment from these constituents.

5.0 RECOMMENDATION

Based on the In Situ screening of the waste pile with the Niton XRF unit, the proximity of the waste pile to Lucas Gulch, and EPA's APA Checklist (Appendix A), it is recommended that a Site Inspection (SI) be completed. As part of this inspection, water samples from pore spaces of the stream gravels should be collected as well as sampling of the benthic macroinvertebrate organisms. In addition to testing water samples from the pore spaces of the gravels for the presence of metallic elements, water parameters such as pH, conductivity, turbidity, dissolved oxygen, temperature, total dissolved solids, hardness, and oxygen reduction potential are required. The waste pile should be sampled at depth and a determination of the volume should be calculated. The water from the adit should be sampled and tested for the field parameters as outlined above as well as for elemental contaminants. Acid base accounting (ABA) is required. Sediment samples are to be collected from transects of the stream and preferably at depth and analyzed for total as well as for available metals. Surface water samples are also required for analysis for both total and available metals.

Appendix A

ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

This checklist can be used to help the site investigator determine if an Abbreviated Preliminary Assessment (APA) is warranted. This checklist should document the rationale for the decision on whether further steps in the site assessment process are required under CERCLA. Use additional sheets, if necessary.

Checklist Preparer: Dennis Boles, Environmental Engineer (Name/Title) July 9, 2002 (Date)

Winema NF, 2819 Dahlia St, Klamath Falls, OR 97601 (Address) 541-219-1201 (Phone)

djboles@fs.fed.us (E-Mail Address)

Site Name: Ajax Mine

Previous Names (if any): None

Site Location: The Site is located approximately 3.0 miles north of Granite, OR on County Road 73. The site is located on the riparian area of Lucas Gulch.

Legal Description: Latitude: 44°51'25"N Longitude: 118°24'16"W

Describe the release (or potential release) and its probable nature: The waste pile is situated in the riparian zone of Lucas Gulch with obvious signs of migration of contaminants. The following elements exceed industrial levels of the PRGs and the results and relevant PRG industrial levels are listed in parentheses:

Iron – 385,840 (100,000 mg/kg), Arsenic – 420 (2.7 mg/kg cancer and 440 mg/kg noncancer endpoints)

Part 1 - Superfund Eligibility Evaluation

If All answers are "no" go on to Part 2, otherwise proceed to Part 3	YES	NO
1. Is the site currently in CERCLIS or an "alias" of another site?		X
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		X
3. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		X
4. Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		X
5. Is there sufficient documentation to demonstrate that no potential for a release that could cause adverse environmental or human health impacts exist (i.e., comprehensive remedial investigation equivalent data showing no release above ARAR's, completed removal action, documentation showing that no hazardous substance release have occurred, or an EPA approved risk assessment completed)?		X

Please explain all "yes" answer(s), _____

Part 2 - Initial Site Evaluation

For Part 2, if information is not available to make a "yes" or "no" response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

If the answer is "no" to any questions 1, 2, or 3, proceed directly to Part 3.	**YES**	**NO**
1. Does the site have a release or a potential to release?	X	
2. Does the site have uncontained sources containing CERCLA eligible substances?	X	
3. Does the site have documented on-site, adjacent, or nearby targets?	X	

If the answers to questions 1, 2, and 3 above were all "yes" then answer the questions below before proceeding to Part 3.	**YES**	**NO**
4. Does documentation indicate that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		X
5. Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?	X	
6. Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (i.e., targets within 1 mile)?	X	
7. Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?	X	

Notes:

EXHIBIT 1
SITE ASSESSMENT DECISION GUIDELINES FOR A SITE

Exhibit 1 identifies different types of site information and provides some possible recommendations for further site assessment activities based on that information. You will use Exhibit 1 in determining the need for further action at the site, based on the answers to the questions in Part 2. Please use your professional judgment when evaluating a site. Your judgment may be different from the general recommendations for a site given below.

Suspected/Documented Site Conditions		**APA**	**FULL PA**	**PA/SI**	**SI**
1. There are no releases or potential to release.		Yes	No	No	No
2. No uncontained sources with CERCLA-eligible substances are present on site.		Yes	No	No	No
3. There are no on-site, adjacent, or nearby targets		Yes	No	No	No
4. There is documentation indicating that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site.	Option 1: APA SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	No
5. There is an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site.	Option 1: APA SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	N/A
6. There is an apparent release and no documented on-site targets and no documented immediately adjacent to the site, but there are nearby targets. Nearby targets are those targets that are located within 1 mile of the site and have a relatively high likelihood of exposure to a hazardous substance migrating from the site.		No	Yes	No	No
7. There is no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site.		No	Yes	No	No

Part 3 - EPA Site Assessment Decision

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was “no,” then an APA may be performed and the “NFRAP” box below should be checked. Additionally, if the answer to question 4 in Part 2 is “yes,” then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the “Lower Priority SI” or “Higher Priority SI” box below; or Option 2 -- proceed with a combined PA/SI assessment.

Check the box that applies based on the conclusions of the APA:

( ) NFRAP	( ) Refer to Removal Program – further site assessment needed
(X) Higher Priority SI	( ) Refer to Removal Program – NFRAP
( ) Lower Priority SI	( ) Site is being addressed as part of another CERCLIS site
( ) Defer to RCRA Subtitle C	( ) Other: _____
( ) Defer to NRC	

Regional EPA Reviewer: __N/A_____ _____
Print Name/Signature Date

PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:

The waste pile at the Ajax Mine is on the riparian zone of Lucas Gulch. It is obvious that material is transported to Lucas Gulch during rain and snowmelt situations. Considering Lucas Gulch is a tributary to Granite Creek, which is prime habitat for Chinook salmon and EPA reports showing elevated arsenic and mercury in sediments from Lucas Gulch, an SI is warranted for this Site. Also, water samples from the pore spaces of the gravels and sediments of Lucas Gulch should be collected both up and down stream from the Site and analyzed to determine impacts to benthic macroinvertebrate organisms. Iron and arsenic exceed the EPA Region IX PRGs for industrial levels.

NOTES:

The Site is situated on moderate to steep side slopes and getting drilling equipment on the waste pile can easily be accomplished. Based on this, drilling is appropriate in order to collect soil samples for laboratory evaluation and to determine the volume of material onsite as well as any impact to groundwater in the area.

There is water coming from the mine and being collected in the retention pond just below the mine portal as shown in the photos in Appendix B. This pond is situated on top of waste rock material. The photo on the cover shows iron staining of soil below the waste rock material and this material is adjacent to Lucas Gulch, which is seen as a ditch in the upper right hand portion of the photo.

Appendix B

ADDITIONAL SITE PHOTOS



Portal



Retention Pond
Below the Portal

ABBREVIATED PRELIMINARY ASSESSMENT

MAGNOLIA MINE



Umatilla National Forest
Grant County, Oregon

December 2002

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APPENDICES

Appendix A Abbreviated Preliminary Assessment Checklist
Appendix B Additional Site Photos

EXECUTIVE SUMMARY

The Forest Service performed an Abbreviated Preliminary Assessment for the Magnolia Mine (Site) to determine the need for further site characterization. The Site waste piles are placed on relatively flat terrain and are located in the riparian area of Lucas Gulch. A Niton XRF unit was used for In Situ field screening of the waste piles for any potential contaminants. Water and sediment samples were not collected.

Arsenic concentrations were the only element that exceeded EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil. It is apparent material is moving into Lucas Gulch from erosion forces.

Based on the proximity of the Site to Lucas Gulch, it is recommended a Site Inspection (SI) be performed.

1.0 INTRODUCTION

An Abbreviated Preliminary Assessment (APA) was performed by the US Forest Service in accordance with the EPA "Guidance for Performing Preliminary Assessments Under CERCLA", EPA "Improving Site Assessment: Abbreviated Preliminary Assessments" of 1999, the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the Superfund Amendments and Reauthorization Act (SARA) of 1986, and the National Contingency Plan as outlined in 40 CFR Parts 300.410(c)(1)(i-v).

The purpose of this assessment was to determine whether or not there is a potential for a release of contaminants to the environment and/or to human health. The purpose of an APA is to determine whether further site characterization is warranted. A Niton XRF 700 Series was utilized to help in the preliminary screening of this Site.

2.0 SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

The Magnolia Mine (Site) is located approximately 3.0 miles north of Granite, OR, on County Road 73. The legal description for the Site is; Latitude: 44° 51' 32"N, Longitude: 118° 24' 08"W, Sec 22, T 8 S, R 35.5 E, USGS Quadrangle Map - Granite. The Site is situated on flat to moderate hillsides adjacent to Lucas Gulch. The Site is located in the mining district of Granite.

The Site consists of one adit with water discharge coming from the adit and discharging into two settling ponds in waste rock material with the final discharge into Lucas Gulch. The adit is screened, although a deer was observed coming out of the adit through an opening in the screen. The waste piles are situated on top of relatively flat terrain and in the riparian zone of Lucas Gulch. There is a cabin just north of the portal. Accessing the site is easily accomplished via way of the old Forest Service road. Approximately one acre is disturbed on the Site.

There is limited historical data available on this mine. It appears this mine was developed in the late 1800s, and consisted of three adits totaling 1400 feet. Three stopes were developed and the longest was 205 feet, with an average width of four feet. A ten-stamp mill was erected in 1899.

In 1996, EPA reported elevated arsenic (700 ppm) and mercury (1.6 ppm) in sediments in Lucas Gulch. The arsenic and mercury concentrations in the adit discharge were reportedly lower than what was in Lucas Gulch suggesting the bulk of the contamination might be from the Magnolia mine, which is further upstream. Lucas Gulch drains into Granite Creek, which is considered critical habitat for Chinook salmon.

3.0 SITE SAMPLING AND TEST RESULTS

A Niton XRF, XL-722S was used to assess the waste piles for potential contamination. In Situ testing was performed on the Site per EPA Method 6200. Surface soils were removed to approximately 4 to 6 inches below grade in order to get below highly oxidized surface layers. Rocks, debris and other deleterious materials were removed. The soil was worked to gain a flat surface area on which to set the Niton.

No surface water, sediment, or adit discharge samples were collected and analyzed.

The following constituents exceeded EPA Region IX PRG industrial levels:

Location	Constituent	Result (mg/kg)	PRG (mg/kg)
Upper Waste Pile	Arsenic	395	2.7*
Lower Waste Pile	Arsenic	470	2.7

*Arsenic Industrial PRG is 2.7 mg/kg for cancer end point and 440 mg/kg for noncancer endpoints.

It is apparent that material from the waste piles is entering Lucas Gulch. It is not clear whether subsurface seepage from the waste pile is occurring and thus creating a contaminated groundwater plume, which would also enter Lucas Gulch. The ramification from this material entering an aquatic environment is unknown at this time.

4.0 SUMMARY

The waste piles are situated in the riparian zone of Lucas Gulch. It was apparent erosion forces are contributing some material to Lucas Gulch.

The constituents of concern that exceeded EPA Region IX industrial levels in soil were arsenic. At this time, it is unclear as to any impacts to the aquatic environment from this constituent.

5.0 RECOMMENDATION

Based on the In Situ screening of the waste piles with the Niton XRF unit, the proximity of the waste pile to Lucas Gulch, and EPA's APA Checklist (Appendix A), it is recommended that a Site Inspection (SI) be completed. As part of this inspection, water samples from pore spaces of the stream gravels should be collected as well as sampling of the benthic macroinvertebrate organisms. In addition to testing water samples from the pore spaces of the gravels for the presence of metallic elements, water parameters such as pH, conductivity, turbidity, dissolved oxygen, temperature, total dissolved solids, hardness, and oxygen reduction potential are required. The waste pile should be sampled at depth and a determination of the volume should be calculated. The water from the adit should be sampled and tested for the field parameters as outlined above as well as for elemental contaminants. Acid base accounting (ABA) is required. Sediment samples are to be collected from transects of the stream and preferably at depth and analyzed for total as well as for available metals. Surface water samples are also required for analysis for both total and available metals.

Appendix A

ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

ABBREVIATED PRELIMINARY ASSESSMENT CHECKLIST

This checklist can be used to help the site investigator determine if an Abbreviated Preliminary Assessment (APA) is warranted. This checklist should document the rationale for the decision on whether further steps in the site assessment process are required under CERCLA. Use additional sheets, if necessary.

Checklist Preparer: Dennis Boles, Environmental Engineer (Name/Title) July 9, 2002 (Date)

Winema NF, 2819 Dahlia St, Klamath Falls, OR 97601 (Address) 541-219-1201 (Phone)

djboles@fs.fed.us (E-Mail Address)

Site Name: Magnolia Mine

Previous Names (if any): None

Site Location: The Site is located approximately 3.0 miles north of Granite, OR on County Road 73. The site is located on the riparian area of Lucas Gulch.

Legal Description: Latitude: 44°51'32"N Longitude: 118°24'08"W

Describe the release (or potential release) and its probable nature: The waste piles are situated in the riparian zone of Lucas Gulch with obvious signs of migration of contaminants. The following element exceeded industrial levels of the PRGs and the results and relevant PRG industrial levels are listed in parentheses:

Arsenic – 420 (2.7 mg/kg cancer and 440 mg/kg) noncancer endpoints

Part 1 - Superfund Eligibility Evaluation

If All answers are "no" go on to Part 2, otherwise proceed to Part 3	YES	NO
1. Is the site currently in CERCLIS or an "alias" of another site?		X
2. Is the site being addressed by some other remedial program (Federal, State, or Tribal)?		X
3. Are the hazardous substances potentially released at the site regulated under a statutory exclusion (i.e., petroleum, natural gas, natural gas liquids, synthetic gas usable for fuel, normal application of fertilizer, release located in a workplace, naturally occurring, or regulated by the NRC, UMTRCA, or OSHA)?		X
4. Are the hazardous substances potentially released at the site excluded by policy considerations (i.e., deferred to RCRA corrective action)?		X
5. Is there sufficient documentation to demonstrate that no potential for a release that could cause adverse environmental or human health impacts exist (i.e., comprehensive remedial investigation equivalent data showing no release above ARAR's, completed removal action, documentation showing that no hazardous substance release have occurred, or an EPA approved risk assessment completed)?		X

Please explain all "yes" answer(s), _____

Part 2 - Initial Site Evaluation

For Part 2, if information is not available to make a "yes" or "no" response, further investigation may be needed. In these cases, determine whether an APA is appropriate. Exhibit 1 parallels the questions in Part 2. Use Exhibit 1 to make decisions in Part 3.

If the answer is "no" to any questions 1, 2, or 3, proceed directly to Part 3.	**YES**	**NO**
1. Does the site have a release or a potential to release?	X	
2. Does the site have uncontained sources containing CERCLA eligible substances?	X	
3. Does the site have documented on-site, adjacent, or nearby targets?	X	

If the answers to questions 1, 2, and 3 above were all "yes" then answer the questions below before proceeding to Part 3.	**YES**	**NO**
4. Does documentation indicate that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site?		X
5. Is there an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site?	X	
6. Is there an apparent release and no documented on-site targets or targets immediately adjacent to the site, but there are nearby targets (i.e., targets within 1 mile)?	X	
7. Is there no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site?	X	

Notes:

EXHIBIT 1
SITE ASSESSMENT DECISION GUIDELINES FOR A SITE

Exhibit 1 identifies different types of site information and provides some possible recommendations for further site assessment activities based on that information. You will use Exhibit 1 in determining the need for further action at the site, based on the answers to the questions in Part 2. Please use your professional judgment when evaluating a site. Your judgment may be different from the general recommendations for a site given below.

Suspected/Documented Site Conditions		**APA**	**FULL PA**	**PA/SI**	**SI**
1. There are no releases or potential to release.		Yes	No	No	No
2. No uncontained sources with CERCLA-eligible substances are present on site.		Yes	No	No	No
3. There are no on-site, adjacent, or nearby targets		Yes	No	No	No
4. There is documentation indicating that a target (i.e., drinking water wells, drinking surface water intakes, etc.) has been exposed to a hazardous substance released from the site.	Option 1: APA SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	No
5. There is an apparent release at the site with no documentation of exposed targets, but there are targets on site or immediately adjacent to the site.	Option 1: APA SI	Yes	No	No	Yes
	Option 2: PA/SI	No	No	Yes	N/A
6. There is an apparent release and no documented on-site targets and no documented immediately adjacent to the site, but there are nearby targets. Nearby targets are those targets that are located within 1 mile of the site and have a relatively high likelihood of exposure to a hazardous substance migrating from the site.		No	Yes	No	No
7. There is no indication of a hazardous substance release, and there are uncontained sources containing CERCLA hazardous substances, but there is a potential to release with targets present on site or in proximity to the site.		No	Yes	No	No

Part 3 - EPA Site Assessment Decision

When completing Part 3, use Part 2 and Exhibit 1 to select the appropriate decision. For example, if the answer to question 1 in Part 2 was “no,” then an APA may be performed and the “NFRAP” box below should be checked. Additionally, if the answer to question 4 in Part 2 is “yes,” then you have two options (as indicated in Exhibit 1): Option 1 -- conduct an APA and check the “Lower Priority SI” or “Higher Priority SI” box below; or Option 2 -- proceed with a combined PA/SI assessment.

Check the box that applies based on the conclusions of the APA:

( ) NFRAP	( ) Refer to Removal Program – further site assessment needed
(X) Higher Priority SI	( ) Refer to Removal Program – NFRAP
( ) Lower Priority SI	( ) Site is being addressed as part of another CERCLIS site
( ) Defer to RCRA Subtitle C	( ) Other: _____
( ) Defer to NRC	

Regional EPA Reviewer: __N/A_____ _____
Print Name/Signature Date

PLEASE EXPLAIN THE RATIONALE FOR YOUR DECISION:

The waste piles at the Magnolia Mine are situated on the riparian zone of Lucas Gulch. It is obvious that material is transported to Lucas Gulch during rain and snowmelt situations. Considering Lucas Gulch is a tributary to Granite Creek, which is prime habitat for Chinook salmon and EPA reports showing elevated arsenic and mercury in sediments from Lucas Gulch, an SI is warranted for this Site. Also, water samples from the pore spaces of the gravels and sediments of Lucas Gulch should be collected both up and down stream from the Site and analyzed to determine impacts to benthic macroinvertebrate organisms. Iron and arsenic exceed the EPA Region IX PRGs for industrial levels.

NOTES:

The Site is situated on flat to moderate side slopes and getting drilling equipment on the waste pile can easily be accomplished. Based on this, drilling is appropriate in order to collect soil samples for laboratory evaluation and to determine the volume of material onsite as well as any impact to groundwater in the area.

Appendix B

ADDITIONAL SITE PHOTOS



Portal



Adit Drainage



Settling Pond

PUBLIC PARTICIPATION PLAN
AJAX AND MAGNOLIA MINES IN LUCAS GULCH

Grant County, Oregon
Prepared by the
Umatilla National Forest
2517 S.W. Hailey Avenue
Pendleton, Oregon 97801

April 6, 2004

OVERVIEW

This Public Participation Plan (Plan) was designed pursuant to the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) in order to involve potentially interested members of the public in the vicinity of the Ajax and Magnolia Mines (Sites), located on the North Fork John Day District of the Umatilla National Forest, Grant County, Oregon. The purpose of this Plan is to document how the public will be kept informed of proposed Forest Service activities at the Sites, and how the Forest Service will solicit public comments on the proposed investigations and possible clean-up activities at these two Sites.

SITE DESCRIPTION

The Granite Creek watershed has a rich history of lode and placer mining dating back to 1862, and mining in the Granite Creek area was a significant part of Oregon's mineral industry prior to World War II. In the late 1880s, lode mining became the most profitable form of mining with the advent of large-scale drilling and crushing equipment and chemical extraction methods (to extract the gold from its alloys). In the 1920s, dredging for gold in the rivers again became profitable using large-scale equipment. Numerous dredge tailings piles are still visible along these creeks. Mining activities have reduced in scale since World War II, mostly due to increased cost of operations and the increased difficulty in processing the lower grade deposits left after the high grading of the pre-World War II era. Although the price of gold and other precious metals has increased significantly since then, the current level of mining in this watershed has reduced to small placer and lode operations.

The Sites are located on Lucas Gulch approximately four miles north of the town of Granite, in Township 8 South, Range 35 ½ East, Section 22, Willamette Meridian (Figures 1 and 2). Lucas Gulch is a tributary to Granite Creek which flows south past Granite and then west into the North Fork John Day River, eventually flowing into the Columbia River about 100 miles east of Portland, Oregon. Access to the mines is by County Road 73 and Forest Service Road 580, which is restricted by a locked gate. The Magnolia is about .2 mile upstream from the Ajax, and both are situated on the north bank of Lucas Gulch at about 5,400 feet in elevation.

Magnolia Mine Site

The Magnolia Mine Site covers approximately 1 acre, and currently consists of 4 unpatented lode claims with 4 adits, 2 of which are collapsed and 2 are intact and discharging mine water. The discharge from the main adit flows into 2 settling ponds in series, and then infiltrates into the

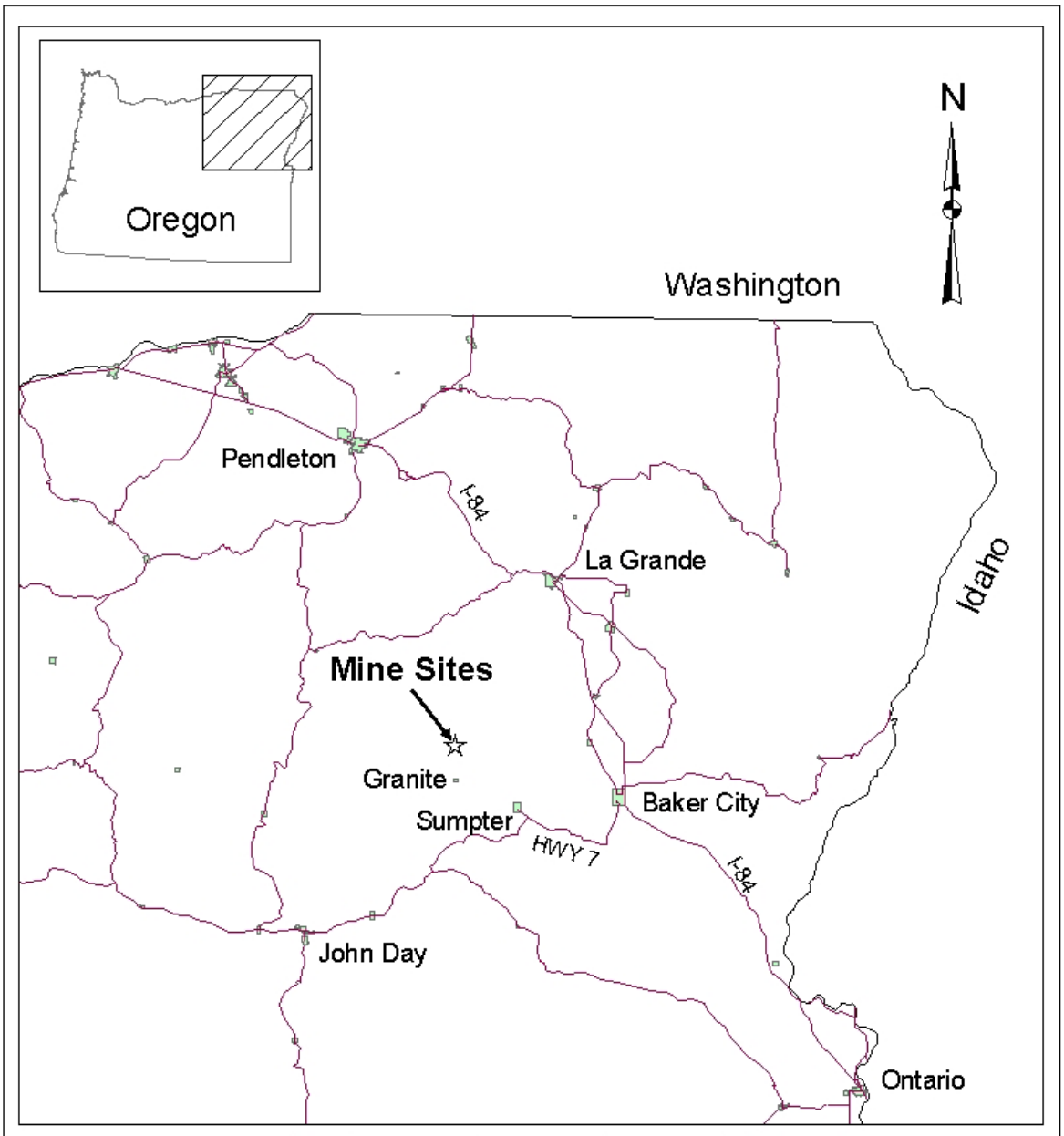

FIGURE 1
AJAX/MAGNOLIA MINE SITES
VICINITY MAP

G.Visconty
April 6, 2004

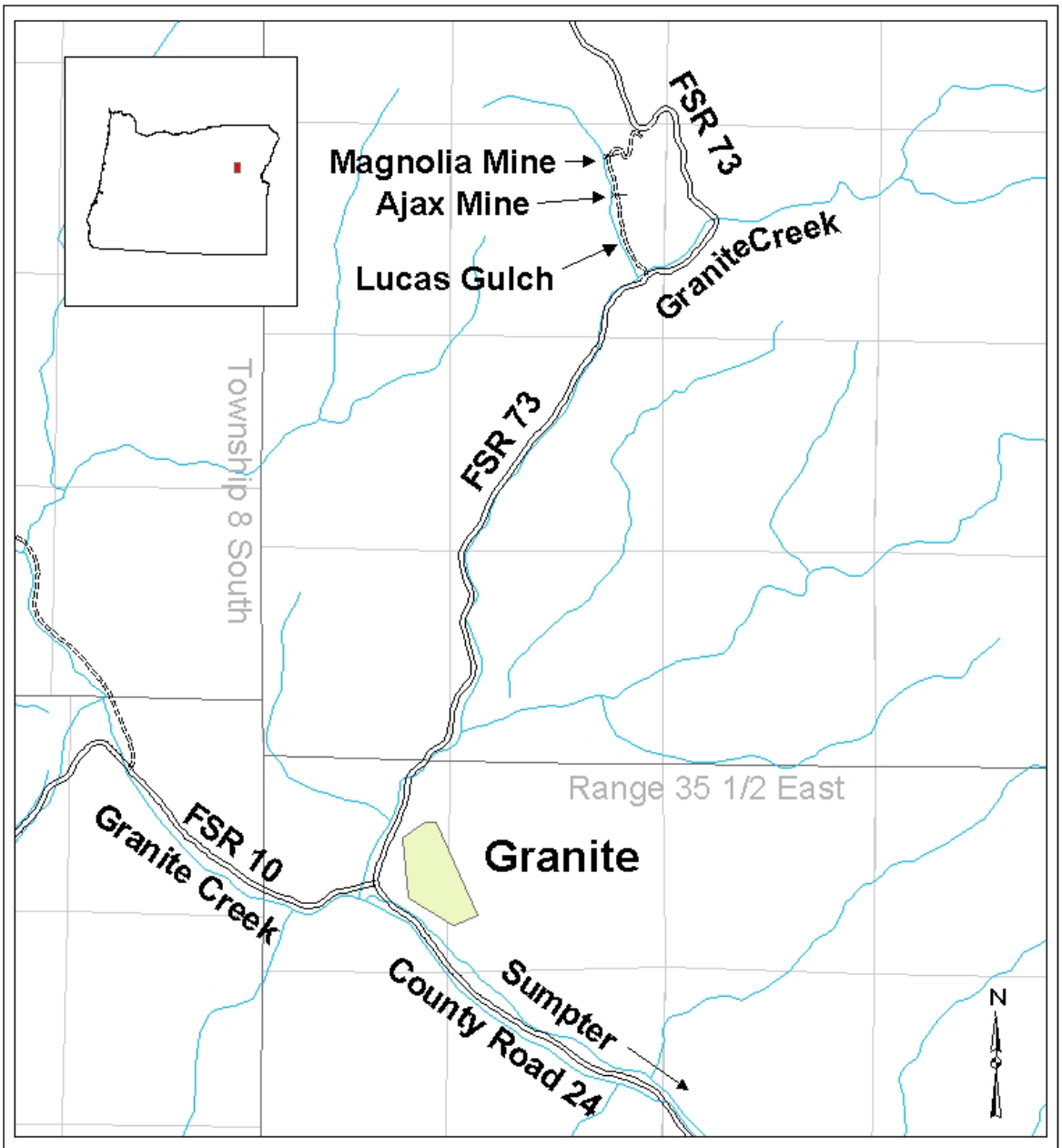

FIGURE 2

Ajax/Magnolia Vicinity Map
T 8 S, R 35 1/2 E, Willamette Meridian

G.Visconty
April 6, 2004

soils. There is evidence that overland flow occurs from the last pond, likely during spring high water runoff, which then drains into Lucas Gulch. The discharge from the main open adit has stained the drainage ditch between the adit and first settling pond a heavy red color. The other intact adit (boarded up) is located on the south Side of Lucas Gulch, and discharges mine water directly into Lucas Gulch. The drainage is only slightly stained red at the mouth of the adit and virtually clear at its point of entry into Lucas Gulch approximately 15 to 20 ft from the adit.

The original seven lode claims were located for the Magnolia group between 1895 and 1899, consisting of Magnolia, Jupiter, Tacoma, Rose, Atlas, Helena, and Violet. Over the years that these claims were maintained, there were numerous individuals and several corporations who owned this property through a series of complex location amendments, transfer deeds, and sheriff's sales. These claims were dropped in 1996. Four of them were relocated in 2002; the Helena, Magnolia, Rose, and Violet.

A ten-stamp mill was erected in 1899, and a very small amount of ore was processed until 1904. The property was reported to be idle in 1916; however the owners were planning mill and mine activities. Part of their plans included an addition of a cyanide plant. There is no evidence or record indicating that this or any other mining activities took place at this time.
From the 1920s to the present, work consisted of maintaining the present mine, with some exploration activities to try to get the mine back into production. No further production took place at the Magnolia.

Ajax Mine Site

The Ajax Mine Site covers approximately 1 acre, and is currently inactive. The site consists of a total of 4 adits, two of which are near the creek on the north side. The other two adits are located on the slope above Lucas Gulch. The main adit, which is adjacent to Forest Service Road 580 and locked with a wooden door, discharges mine water through a polyvinyl chloride (PVC) pipe under the road, and into a narrow settling pond (approximately 4 ft by 10 ft in size) which was excavated in the mine dump in the riparian zone of Lucas Gulch. Water from this pond seeps through the mine dump material into a heavily iron stained bog at the base of this dump, and then directly into the creek.

There are currently no active mining claims at the Ajax; the last ones having lapsed in 1996. The original Ajax group of mining claims consisted of the Golden Star, Snowbird, Vigilant, Ajax No. 1, Ajax No. 2, the Ajax mill site, and the Snowbird Fraction (later Snowbird No. 2), located between 1895 and 1902. County records indicate that a mill was constructed near the main adit in 1905, and $40,000 in gold and silver were reportedly produced from this mill in 1905 and 1906. County records also indicate that a five-stamp mill was erected near the mouth of Lucas Gulch in 1916, and that intermittent milling occurred there between 1916 and 1935. Up until 1996, only periodic maintenance occurred at this Site.

FOREST SERVICE ACTIONS TAKEN TO DATE

Preliminary Assessments

The Forest Service performed Abbreviated Preliminary Assessments for the two Sites during the summer of 2002 to determine the need for further site characterization. A Niton XRF field unit

was used for in-situ field screening of the waste pile for any potential contaminants. Water and sediment samples were not collected at that time.

Arsenic concentrations in the mine dumps at both Sites exceed EPA Region IX Preliminary Remediation Goals (PRG) as to acceptable industrial levels in soil. The mine waste rock at Ajax also exceeds the PRGs for iron.

Based on the metals concentrations and proximity of both Sites to Lucas Gulch, a Site Investigation (SI) to cover both Sites was recommended.

Site Investigations

An SI was conducted to cover both sites in June, 2003, and documented in a final report in January, 2004. The purpose of the SI was to assess the immediate or potential threat that mine related wastes at the Sites may pose to human health and the environment. In addition, information was collected in support of a decision to be made regarding the need for further action under CERCLA and the Superfund Amendments and Reauthorization Act (SARA). Potential contaminant sources identified at the Magnolia and Ajax Mine Sites included waste rock and mine water discharge. The results of this investigation indicate that arsenic is the primary contaminant of concern, and that arsenic is present in the mine waste rock and mine discharge water, and was detected in Lucas Gulch downstream from the Magnolia Mine in concentrations exceeding background and Oregon State surface water quality standards. Other metals, including mercury, cadmium, iron, and zinc are also present and may pose a threat to the environment.

FOREST SERVICE ACTIONS TO BE COMPLETED

Engineering Evaluation/Cost Assessment (EE/CA)

An Engineering Evaluation/Cost Assessment (EE/CA) will be completed to cover both Sites during the 2004 field season. This evaluation will address concerns raised in the SI, and will present a determination if removal or remedial actions are necessary at the Sites. This evaluation will include a Forest Service proposed removal or remedial action, and alternatives to that proposed action based on public and internal comments and concerns solicited during a 30 day public scoping period. When the draft document is complete, public notices will be published indicating its availability for further public comments. Based on those public and internal comments, an alternative will be selected and a Decision made by the Regional Forester, to be implemented at the Sites.

Removal/Remedial Actions

Based on the EE/CA, removal or remedial actions will be implemented at the Sites if necessary. They will be designed to address the potential contaminants found at the Sites to prevent any further degradation indicated in the EE/CA. Public notifications will be made in the event that these actions become necessary.

PUBLIC INVOLVEMENT

The North Fork John Day District Office in Ukiah, Oregon maintains a current mailing list of all of the members of the public, and other State and Federal agencies who have expressed interest in Forest Service activities on that District. They also maintain mailing addresses of the landowners in the vicinity Granite and the mine Sites. From these lists, a comprehensive list of potentially interested members of the public was developed, and will be maintained for the duration of this project. The complete list is included at the end of this Plan.

The spokesperson for this project is Greg Visconty, Area Mining Geologist, located in the Wallowa Whitman National Forest Supervisor's Office at:

1550 Dewey Ave.
P.O. Box 907
Baker City, Oregon 97814
541-523-1251

Also available for public questions concerning this project is Caty Clifton, Umatilla Forest Hydrologist at:

2517 SW Hailey Ave
Pendleton, OR 97801
541-278-3822

Craig Smith Dixon, District Ranger at the North Fork John Day District will also be available to respond to public concerns, at:

P.O. Box 158
Ukiah, Oregon 97880
541-427-3231

An Administrative Record File will be maintained at the Wallowa Whitman Supervisor's Office and at the North Fork John Day District Office for public viewing and copying. A copy of the pertinent documents will also be available for viewing on the Umatilla's internet website at http://www.fs.fed.us/r6/uma/projects/readroom/ajax-magnolia/, for those who have internet services.

PUBLIC NOTICES

Public notices of upcoming Forest Service actions associated with this project will be placed in the local newspapers. These notices will briefly describe the activity and expected duration, list the responsible official and where comments can be sent, and describe where additional information can be obtained. Public comment periods usually run for 30 days following the publication in the local newspaper.

PUBLIC MAILING LIST

ALLIANCE FOR THE WILD ROCKIES
ECOSYSTEM DEFENSE
PO BOX 8731
MISSOULA MT 59807

JAMES P BAILEY
307 NW INGRAM LN
PENDLETON OR 97801

GRANDE RONDE RESOURCE COUNCIL
DAVID BISHOP
6205 NE 37TH AVE
PORTLAND OR 97211-7913

BLUE MOUNTAINS BIODIVERSITY PROJECT
KAREN COULTER
27803 WILLIAMS LANE
FOSSIL OR 97830

BLUE MOUNTAIN LUMBER PRODUCTS
BILL CAMERON
PO BOX 1161
PENDLETON OR 97801

CHRIS BURFORD
PO BOX 64
PENDLETON OR 97801

COLUMBIA RIVER INTER-TRIBAL FISH COM
ATTN JIM WEBER POLICY ASSISTANT
729 NE OREGON STE 200
PORTLAND OR 97232

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION
DEPT OF NATURAL RESOURCES
TERRY SHEPHERD
PO BOX 638
PENDLETON OR 97801

CONFEDERATED TRIBES OF THE
UMATILLA INDIAN RESERVATION
ERIC QUAEMPTS
PO BOX 638
PENDLETON OR 97801

CONFEDERATED TRIBES OF THE UMATILLA
INDIAN RESERVATION
DEPT OF NATURAL RESOURCES
JEFF VAN PELT
PO BOX 638
PENDLETON OR 97801

CONFEDERATED TRIBES OF THE
WARM SPRINGS INDIAN RESERVATION
FARA CURRIM OFF RESERVATION HABITAT BIO
PO BOX C
WARM SPRINGS OR 97761

CONFEDERATED TRIBES OF THE
WARM SPRINGS INDIAN RESERVATION
GARLAND BRUNOE CHAIRMAN, TRIBAL COUNCIL
PO BOX C
WARM SPRINGS OR 97761

CONFEDERATED TRIBES OF THE WARM
SPRINGS RESERVATION
NATURAL RESOURCES DEPARTMENT
CLAY PENHOLLOW
PO BOX C
WARM SPRINGS OR 97761

CONFEDERATED TRIBES OF THE
WARM SPRINGS RESERVATION
BOBBY BRUNOE NATURAL RESOURCES
PO BOX C
WARM SPRINGS OR 97761

COOPERATIVE EXTENSION SERVICE
UMATILLA COUNTY
RANDY MILLS COUNTY EXTENSION AGENT
721 SE THIRD STE 3
PENDLETON OR 97801

COOPERATIVE EXTENSION SERVICE
WALLA WALLA COUNTY
WALTER GARY COUNTY EXTENSION AGENT
328 W POPLAR
WALLA WALLA WA 99362-2830

DALE STORE
BUTCH PHELPS
PO BOX 2051
DALE OR 97880

EAST OREGONIAN
BARRY ROCKFORD
211 SE BYERS
PENDLETON OR 97801

JOHN EDWARDS
BOX 414
LEXINGTON OR 97839

JARED GODDARD
PO BOX 001
THURSTON OR 97482-0001

COUNTY COURT OF GRANT COUNTY
201 SOUTH HUMBOLT ST, STE 280
CANYON CITY OR 97820

GRANT SWCD
721 C CANYON BLVD
JOHN DAY OR 97845

GREYSTONE
AMBER MARTIN
10470 OLD PLACERVILLE RD STE 110
SACRAMENTO CA 95827

HELLS CANYON PRESERVATION COUNCIL
GREG DYSON
PO BOX 2768
LA GRANDE OR 97850

HEPPNER RANGER DISTRICT
ENVIRONMENTAL COORDINATOR
PO BOX 7
HEPPNER OR 97836

HENRY HERCHER
2533 SW PHYLLIS DR
GRESHAM OR 97080

PAT HINTON
1336 THIRD STREET
BAKER CITY OR 97814

INLAND NORTHWEST WILDLIFE COUNCIL
ROBERT D PANTHER EXECUTIVE DIRECTOR
N 6116 MARKET ST
SPOKANE WA 99207

RICHARD N ISAACSON
1802 Z AVE
SUBCOMMITTEE
LA GRANDE OR 97850

NIMIIPUU TRIBE
JAKE WHITEPLUME V-CHAIRMAN, NR

PO BOX 365
LAPWAI ID 83540

THE LANDS COUNCIL
MIKE PETERSEN
423 W FIRST AVE STE 240
SPOKANE WA 99201

NIMIIPUU TRIBE
IRA JONES WATERSHED MANAGEMENT
PO BOX 365
LAPWAI ID 83540

JOHN M LEONARD
78554 ECHOLS RD
HERMISTON OR 97838-8470

NIMIIPUU TRIBE
AARON MILES NATURAL RESOURCES
PO BOX 365
LAPWAI ID 83540

J. V. LUNDSTEN
3611 SE 158TH AVE
PORTLAND OR 97236

NIMIIPUU TRIBE
DAVE JOHNSON FISHERIES
PO BOX 365
LAPWAI ID 83540

ROGER NEUFELDT
5457 HWY 35
PARKDALE OR 97041

NIMIIPUU TRIBE
RICH EICHSTAEDT OFFICE OF LEGAL COUNCIL
PO BOX 365
LAPWAI ID 83540

NIMIIPUU TRIBE
ALLEN SLICKPOO JR CHAIRMAN,
NR SUBCOMMITTEE
PO BOX 365
LAPWAI ID 83540

NOAA FISHERIES
RANDY TWETEN
3502 HWY 30
LA GRANDE OR 97850

NIMIIPUU TRIBE
ANTHONY JOHNSON CHAIRMAN
PO BOX 365
LAPWAI ID 83540

NOAA FISHERIES
PROTECT SPECIES PROGRAM
NORTHWEST REGION
525 NE OREGON ST STE 500
PORTLAND OR 97232-2737

NW ENVIRONMENTAL DEFENSE CENTER
STEPHAN OTTO
10015 SW TERWILLIGER BLVD
PORTLAND OR 97219

OREGON DEPT OF FISH & WILDLIFE
JEFF ZAKEL
107 20TH ST
LA GRANDE OR 97850

OREGON DEPT OF ENVIRONMENTAL QUALITY
700 SE EMIGRANT, SUITE 330
PENDLETON OR 97801

OREGON NATURAL RESOURCES COUNCIL
TIM LILLEBO EASTERN OREGON FIELD REP
16 NW KANSAS AVE
BEND OR 97701

OREGON DEPT OF FISH & WILDLIFE
TIM UNTERWEGNER
BOX 9
JOHN DAY OR 97845

OREGON STATE DEPT OF GEOLOGY
AND MINERAL INDUSTRIES
ATTN: DENNIS OLMSTEAD
800 NE OREGON ST #28
PORTLAND OR 97232

OREGON DEPT OF FISH & WILDLIFE
ATTN: TIM BAILEY
RT 1 BOX 18
PENDLETON OR 97801

OREGON STATE DIV OF STATE LANDS
ATTN: FERN SHANK
775 SUMMER STREET NE
SALEM OR 97310

OREGON DEPT OF FISH & WILDLIFE
ATTN KEVIN BLAKELY
73471 MYTINGER LN
PENDLETON OR 97801

PHILIP C PEICK
548 WASHINGTON ST
WALLA WALLA WA 99362

OREGON DEPT OF FISH & WILDLIFE
BRUCE EDDY
ODF&W 107 20TH
LA GRANDE OR 97850

PENDLETON RECORD
PO BOX 69
PENDLETON OR 97801

OREGON DEPT OF FISH & WILDLIFE
HABITAT CONSERVATION DIVISION
PO BOX 59
PORTLAND OR 97207

PINE CREEK LOGGING INC
DON BARNETT
PO BOX 1165
PENDLETON OR 97801

POMEROY RANGER DISTRICT
TERRI JEFFREYS
71 WEST MAIN STREET
POMEROY WA 99347

US ENVIRONMENTAL PROTECTION AGENCY
REGION 10
ENVIRONMENTAL REV COORDINATOR
1200 SIXTH AVENUE, ECO-088
SEATTLE WA 98101

DAVE PRICE
80488 ZERBA RD
ATHENA OR 97813

STUDENT DIRECTOR
ENVIRONMENTAL STUDIES CENTER
5223 UNIVERSITY OF OREGON
EUGENE OR 97403-5223

IVAN & AGNES ROBERTS
601 NE 1ST
ENTERPRISE OR 97828

US FISH & WILDLIFE SERVICE
JOHN KINNEY
3502 HWY 30
LA GRANDE OR 97850

CRESTON ROBINSON
PO BOX 233
HEPPNER OR 97836

US FISH & WILDLIFE SERVICE
PORTLAND FIELD OFFICE FIELD SUPERVISOR
2600 SE 98TH AVE STE 100
PORTLAND OR 97266

SIERRA CLUB JUNIPER GROUP
JOHN E BARRY
BOX 566
LA GRANDE OR 97850

ROBERTA VANDEHEY
20481 WINLOCK LANE
FOSSIL OR 97830

UMATILLA BASIN WATERSHED COUNCIL
TRACY BOSEN
PO BOX 1551
PENDLETON OR 97801

WALLA WALLA RANGER DISTRICT
UMATILLA NATIONAL FOREST
ENVIRONMENTAL COORD
1415 WEST ROSE
WALLA WALLA WA 99362

UMATILLA NATIONAL FOREST
ENVIRONMENTAL COORDINATOR
2517 SW HAILEY AVENUE
PENDLETON OR 97801

WESTERN WASHINGTON UNIVERSITY
DOCUMENTS DEPT WILSON LIBRARY
ROBERT LOPRESTI
BELLINGHAM WA 98225

WILDERNESS SOCIETY
ATTN BOB FRIEMARK
1424 4TH AVE STE 816
SEATTLE WA 98101-2217

WILDLIFE MANAGEMENT INSTITUTE
NW FIELD REP
ROBERT P DAVISON
20325 STURGEON ROAD
BEND OR 97701

RON YOCKIM ATTORNEY AT LAW
548 SE JACKSON ST STE 7
ROSEBURG OR 97470

US SEN. GORDON SMITH
116 S. MAIN, SUITE 3
PENDLETON, OR 97801

US SEN. RON WYDEN
SAC ANNEX BUILDING
105 FIR ST., NO. 201
LA GRANDE, OR 97850

US REP. GREG WALDEN
843 E. MAIN ST., SUITE 400
MEDFORD, OR 97504

STATE SEN. TED FERRIOLLI
DISTRICT 30
750 W. MAIN
JOHN DAY, OR 97845

STATE REP. JOHN MABREY
1825 MINNESOTA
THE DALLES, OR 97058

GRANITE CITY COUNCIL
1378 MAIN ST
GRANITE, OR 97877

Site Inspection
Ajax and Magnolia Mines
Umatilla National Forest, Oregon

Prepared for

U.S. Department of Agriculture–Forest Service
North Fork John Day Ranger District
Umatilla National Forest
Pendleton, Oregon 97801

Prepared by

EA Engineering, Science, and Technology, Inc.
12011 Bellevue-Redmond Road, Suite 200
Bellevue, Washington 98005

January 2004
FINAL
Project No. 13890.16

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LIST OF ACRONYMS

ABA	Acid Base Accounting
AMD	Acid mine drainage
APA	Abbreviated Preliminary Assessment
bgs	Below ground surface.
BLM	(U.S.) Bureau of Land Management
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
EA	EA Engineering, Science, and Technology, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
ER-L	Effects Range-Low
ft/s	Feet per second
HRS	Hazard Ranking System
NF	National Forest
NOAA	National Oceanic and Atmospheric Administration
NVCS	National Vegetation Classification Standards
NWI	National Wetlands Inventory
ODEQ	Oregon Department of Environmental Quality
ODFW	Oregon Department of Fish and Wildlife
ONHIC	Oregon Natural Heritage Information Center
OSC	On-Scene Coordinator
OWRD	Oregon Water Resources Department database
PEL	Probable Effects Level
PRG	Preliminary Remediation Goal
PVC	Polyvinyl chloride
SARA	Superfund Amendments and Reauthorization Act
SI	Site Inspection
SOC	Species of Concern
SPLP	Synthetic Precipitation Leachate Procedure
T&E	Threatened and Endangered
TAL	Target Analyte List
TDL	Target distance limit
TDS	Total dissolved solids
TEL	Threshold Effects Level
TMS	Timed Meander Search
TOC	Total Organic Carbon
TSS	Total suspended solids

USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
XRF	X-Ray Fluorescence
Yds^3	Cubic yards

EXECUTIVE SUMMARY

A Site Inspection (SI) was performed at the Magnolia Mine and Ajax Mine sites, located in the Umatilla National Forest (NF), near Granite, Oregon. The SI was performed to determine if wastes at the sites pose an immediate or potential threat to human health and the environment, and to collect information to support a decision regarding the need for further action.

These abandoned mine sites are located within 0.2 mi from one another adjacent to Lucas Gulch, which is located within the Granite Creek watershed. The Magnolia Mine, upstream from Ajax Mine, consists of 2 vertical shafts, 2 adits with collapsed portals, 2 adits with intact portals, 5 waste rock piles, 2 settling ponds, and a former stamp mill. The 2 intact portals are located on opposite sides of the creek and both were discharging Acid Mine Drainage (AMD) during the SI. AMD from the east adit drains through a ditch and then through a pipe to the settling pond. There is an outlet pipe from the settling pond to the creek, which is located at the top of the pond. The AMD collects in the pond then drains to the creek once the pond fills to the level of the outlet pipe. AMD from the west adit forms a marshy area, then drains into the creek.

The Ajax Mine is on the east side of Lucas Gulch and consists of 1 upper adit with a collapsed portal, 1 lower adit with an intact portal, 1 settling pond, and 2 waste rock piles. The adit with the collapsed portal was dry during the SI. The adit with the intact portal drains AMD through a pipe under the road to the settling pond. The settling pond then discharges through a marshy area to the creek.

Tasks performed during the SI included background research and file review, onsite and offsite reconnaissance, and collection and analysis of soil, waste rock material, surface water, pore water, sediment, plant tissue, and benthic macroinvertebrate samples. Field activities were performed during July 2003. Results of the SI indicated the following:

- A number of metals was detected at concentrations above the comparison criteria in the water samples collected from potential sources at both the Magnolia and Ajax Mine sites, including the adits and retention ponds.

- Both sites include waste rock piles and contaminated soil from AMD. Erosion of fine-grained waste material was evident at both mine sites adjacent to the waste piles along Lucas Gulch.

- A number of metals was detected in surface and/or subsurface soil/waste rock samples at concentrations exceeding comparison criteria at both mine sites.

- There is evidence of an ongoing release of arsenic from sources at the Magnolia Mine to surface water in Lucas Gulch. Based on the results, arsenic is migrating downstream from the Magnolia site to the onsite stream station at Ajax Mine. The results suggest that there is not an ongoing release of metals from potential sources to surface water at the Ajax Mine. Sediments in the vicinity of both the Magnolia and Ajax Mine sites are being impacted by erosional sources at the sites.

Based on the results of the SI, performance of an Engineering Evaluation/Cost Analysis (EE/CA) is recommended at the Magnolia Mine and Ajax Mine sites. As part of the EE/CA, a risk evaluation should be performed to assess the human and ecological impacts, establish site removal cleanup standards, and evaluate remediation technologies.

1. INTRODUCTION

EA Engineering, Science, and Technology, Inc. (EA) performed a site inspection (SI) for the United States Department of Agriculture, Forest Service (Forest Service) at the Magnolia and Ajax Mine sites, located in the Umatilla National Forest near Granite, Oregon. The work was performed under Contract Number 10181-1-D010, Delivery Order R6-14-03-16. The SI was performed in general accordance with U.S. Environmental Protection Agency (USEPA) guidance for performing Site Inspections under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA).

The objectives of the SI were to (1) assess the immediate or potential threat that wastes at the site pose to human health and the environment, and (2) to collect information to support a decision regarding the need for further action under CERCLA and the Superfund Amendments and Reauthorization Act (SARA). Potential contaminant sources identified at the abandoned Magnolia and Ajax Mine sites included waste rock and AMD.

Tasks performed during the SI included background research and file review, onsite and offsite reconnaissance, and collection and analysis of soil, waste, surface water, pore water, sediment, plant tissue, and benthic macroinvertebrate samples. Field work for the SI was performed at the Magnolia and Ajax Mines from 17 to 19 July 2003. The SI was performed in accordance with the project plans including the Work Plan and Sampling and Analysis Plan (EA 2003a), Health and Safety Plan (EA 2003b), and Standard Operating Procedures (EA 2003c). A number of modifications to the sampling locations and techniques were made in the field, based on site observations and field conditions, and with concurrence of the Forest Service On-Scene Coordinator (OSC). These modifications are documented in Appendix A. This report is organized into the following sections:

- Descriptions of the sites, their operational history, and wastes generated are provided in Section 2.

- The results of the SI, along with discussions of the groundwater, surface water, soil, and air exposure pathways, are provided in Section 3.

- A summary and conclusions are provided in Section 4.

- The appendixes include the following: a list of deviations from the project plans (Appendix A), site photographs (Appendix B), a General Information Form (Appendix C), copies of supporting information (Appendix D), aquatic and terrestrial species tables (Appendix E), a detailed wetlands description (Appendix F), aquatic survey results summary tables (Appendix G), waste pile calculations (Appendix H), soil sample descriptions (Appendix I), and laboratory analytical reports (Appendix J).

2. SITE DESCRIPTION, OPERATIONAL HISTORY, AND WASTE CHARACTERISTICS

2.1 DESCRIPTION AND LOCATION

The locations of the Magnolia and Ajax Mines are shown on Plate 1. Both mines are accessed from County Road 73 and Forest Service (FS) Road 580, which is restricted by a locked gate. Just up the road from Ajax Mine is a second locked gate providing access on FS Road 580 to Magnolia Mine. Information regarding the waste pile calculations is provided in Appendix H.

Magnolia Mine

The Magnolia Mine is located approximately 3.5 mi (areal distance) north of the town of Granite, in Grant County, Oregon. The site is situated on flat to moderate slopes adjacent to Lucas Gulch within the Granite Mining District. The site is included on the Granite Quadrangle USGS 7.5-minute topographic map (1995). The location description for the site is:

- Latitude 44° 51’ 32”N
- Longitude 118° 24 08”W
- Section 22, Township 8 South, Range 35.5 East.

The mine is located on Lucas Gulch, approximately 0.2 mi upstream from the Ajax Mine. The site covers an area of approximately 1 acre, and consists of 8 active claims conducting occasional assessment and maintenance activities (USDA 2002). A map showing existing site features is presented as Figure 1. The site consists of the following:

- Four adits, 2 of which are collapsed and 2 are intact and discharging AMD. One of the collapsed adits is located on the east side of Lucas Gulch at approximately 5,400 ft in elevation. The other collapsed adit is located near the southern end of the site just on the east side of the FS Road 580. One of the intact adits is located on the east side of the creek at approximately 5,300 ft in elevation (referred to hereafter as the “eastern” adit). The discharge flowing from this adit empties into 2 settling ponds in series, which then drain into Lucas Gulch. The mine discharge flows from this adit to the first settling pond through an open ditch approximately 100-125 ft in length. This ditch is stained a heavy red color. The other intact adit (boarded up) is located on the West Side of Lucas Gulch (referred to hereafter as the “western” adit). This adit discharges mine drainage as well, which flows directly into Lucas Gulch. The drainage was only slightly stained (red) at the mouth of the adit and virtually clear at its point of entry into Lucas Gulch approximately 15-20 ft from the adit mouth.

- Two settling ponds in series receiving discharge water from the east adit. The upper pond is approximately 30 by 60 ft in size and the lower approximately 20 by 50 ft in size. Both ponds were generally rectangular. The upper pond drains into the lower pond through a pipe and the lower pond is engineered to drain into Lucas Gulch through a 10-12 in. steel culvert. No drainage was discharging from the lower pond during the SI because it was simply infiltrating at the point of entry into the lower pond. During the SI, backhoe tracks were evident in both ponds. The lower settling pond appeared to have been recently drained and the sediment excavated. A portion of the sediment appeared to have been dumped in the upper settling pond. However, there were only small areas of excavated sediment suggesting most of the sediment had been removed from the immediate vicinity. There was an approximate 1 ft layer of red sediment in the undisturbed portion of the lower pond. The height of the lower pond from bottom to the top of

the berm was approximately 6 ft. The water mark indicated a previous water depth of approximately 3 ft.

- A small wooden cabin is situated east of Lucas Gulch and north of the eastern adit. It is not occupied, but is apparently used for storage by claim workers.

- Five waste rock piles were identified at the site, although the edges of the piles could not be clearly delineated. It appeared that a great deal of the waste rock had been moved around and that the ponds had been constructed with waste rock material. Five waste piles were identified at the site, and are discussed from north to south (Figure 1):

  — The largest waste pile (1,171 yds^3), located near the upper east portal.

  — One waste pile (45 yds^3) near the creek at the northern end of the site in the riparian zone. This pile was located adjacent to Lucas Gulch.

  — One small pile (13 yds^3), downgradient of the lower east portal.

  — One pile (188 yds^3), in the riparian zone near the settling ponds. The settling ponds appeared to be constructed in the waste rock.

  — One small pile (8 yds^3) located on the west side of FS Road 580 near the southern end of the site, also in the riparian zone.

Ajax Mine

The Ajax Mine is located approximately 3.3 mi (areal distance) north of the town of Granite, in Grant County, Oregon. The site is situated on moderate to steep hillsides adjacent to Lucas Gulch within the Granite Mining District. Lucas Gulch flows into Granite Creek approximately 0.5 mi west of the site. The site location is included on the Granite Quadrangle U.S. Geological Survey (USGS) 7.5-minute topographic map (1995). The location description for the site is:

- Latitude 44° 51’ 25”N
- Longitude 118° 24’ 16”W
- Section 22, Township 8 South, Range 35.5 East.

The site covers an area of approximately 1 acre, and is currently inactive. A map showing existing site features is presented as Figure 2. The site consisted of the following:

- A total of 4 adits are located at the site. Two of the adits are located on the Ajax No. 2 claim, one on the Ajax No. 1 claim, and another on the Snowbird claim (Koch 1959). Refer to Appendix D for claim locations.

- One adit is located in the riparian zone of Lucas Gulch and discharges AMD through a polyvinyl chloride (PVC) pipe under Forest Service Road 580, and into a narrow settling pond (approximately 4 ft by 10 ft in size). Another adit, which is collapsed, is located approximately 100 ft upgradient and to the northeast. The other 2 adits are reportedly located further uphill; however, these adits could not be located during the SI. It is not known whether the adit portals are still intact or if they are discharging AMD.

- A settling pond constructed on top of a waste rock pile, located within the riparian zone of Lucas Gulch. Heavy staining indicates that the pond has historically breached and overflowed directly into the creek.

- Two waste rock piles; one located near the collapsed portal (134 yds^3) and one on a relatively flat slope in the riparian zone of Lucas Gulch (375 yds^3). Water seeps from the toe of waste pile in the riparian zone (near sample location AJAX-08) and drains into Lucas Gulch. The soil and rocks in this area are stained a red color.

2.2 OPERATIONAL HISTORY AND WASTE CHARACTERISTICS

Mining in the Granite Creek area began as early as the 1860s and was a significant part of Oregon's mineral industry prior to World War II. Dredge mining was the primary form of mining in the region until the mineral production that could be achieved using hand-operated equipment began to decline. In the late 1880s, lode mining became the most profitable form of mining with the advent of large-scale drilling and crushing equipment and chemical extraction methods (to extract the gold from its alloys). In the 1920s, dredging for gold in the rivers again became profitable using large-scale equipment. Numerous dredge tailings piles are still visible along these creeks (USDA 2002).

Magnolia Mine

A list of the known historic owners and operators of the Magnolia Group (USFS 2003), as well as the claim locations (Koch 1959), are provided in Appendix D. The following is a brief summary of the history of the site:

- 1895 through 1899 - Seven lode claims were located for the Magnolia group, consisting of Magnolia, Jupiter, Tacoma, Rose, Atlas, Helena, and Violet. All of these claims were maintained until 1996, and through a series of complex location amendments, transfer deeds, and sheriff's sales, there were a number of individual and 4 mining companies in ownership in 1996.

- 1896 - A ten-stamp millsite was located; however, one report states that the millsite claim was not maintained beyond its original location date (USFS 2003). Another document states that a ten-stamp mill was erected in 1899, and a very small amount of ore was extracted until approximately 1904 (Koch 1959).

- 1916 – The property was reported to be idle by this date; however the new owners were planning mill and mine activities. Part of their plans included an addition of a cyanide plant. It is unknown whether this or any other mining activities took place at this time.

- 1920's – Tunnel work reportedly resumed, however, no production records could be located (USFS 2003).

- 1930's through 1990's – Records indicate some tunnel repair work took place.

- 1965 through 1974 - A second set of lode claims were located at Magnolia in 1965, using the same claim names and locations by another set of owners (Harold Sipp et. al.). This second set of claims was worked by the new owners; however, no deeds exist showing the transfer of these claims.

- 1974 through 2002 - The second set of claims were worked by both sets of owners at the same time from 1974 until 1996. Both filed affidavits with Grant County and the U.S. Bureau of Land Management (BLM) during this time. The second set of claims was dropped in 1999; however the second set of owners relocated 4 of the claims in 2002 and have properly maintained them with Grant County and the BLM since.

Ajax Mine

The Ajax group of mining claims consisted of the Golden Star, Snowbird, Vigilant, Ajax No. 1, Ajax No. 2, the Ajax millsite, and the Snowbird Fraction (later Snowbird No. 2). A list of the known historic owners and operators of the Ajax Mine (USFS 2003), as well as the claim locations (Koch 1959), are provided in Appendix D.

Golden Star Claim:

- 1895 through 1902 - The Golden Star claim was located in 1895. The claim changed hands several times between 1898 and 1902 as individual owners sold percentages of their interests.

- 1902 - There were 6 owners with various percentages of undivided interests, and by 1912 that had declined to four, though not all were the same as in 1902.

- 1916 through 1951 - There were 2 owners registered, Finlay McDonald and J.J. O'Dair, in 1916. This ownership share was maintained until 1951, ten years after O'Dair's death. At that time, O'Dair's trust dissolved and his 50% ownership was transferred to his widow, and eventually his children (USFS 2003).

Remaining Claims:

- 1989 through 1935 - The remaining claims in the Ajax group were located between 1989 and 1902. These claims also changes hands several times, until 1917 when William Lachner and J.J. O'Dair became equal owners. They maintained that ownership until 1935 when William Lachner sold all of his interest to J.J. O'Dair.

Ajax Mill Site:

County records indicate that a mill did exist on this mill site, however, no historic records could be located that indicated there was any production from this mill. Records indicate that the following construction activities took place: construction of an ore bin, a road to the ore bin, mill building and tressle repairs, and construction of a tramway. Parts of a remaining tramway were observed near the lower adit during the SI field activities (Figure 2); however, remains of the mill site near Lucas Gulch could not be located.

- 1916 through 1935 - The Ajax Mill Site was located at the mouth of Lucas Gulch on Granite Creek in 1916, and was sold to William Lachner in 1917. Lachner subsequently sold it to J.J. O'Dair in 1935.

- 1993 – The mill site was formally abandoned by J.J O'Dair's daughter, Rosemary Guinn Burton.

Records indicate that a mill structure existed on the Ajax No. 2 claim and that there was some production between 1905 and 1906, likely from this mill (USFS 2003).

The remaining claims in the group were located between 1898 and 1902. They also changed hands several times until 1917, when William Lachner and J.J. O'Dair became equal owners. This arrangement lasted until 1935 when Lachner sold all of his interest to O'Dair. According to the BLM, all of the claims, including the Golden Star, lapsed in 1996 (USFS 2003).

The five-stamp Ajax millsite was located in 1916 at the mouth of Lucas Gulch on Granite Creek. It was sold to William Lachner in 1917, who subsequently sold it to J.J. O'Dair in 1935 with all his other interests. It was maintained until 1993, when it was formally abandoned by Rosemary Guinn Burton, the daughter of J.J. O'Dair (USFS 2003).

Proof of Labor certificates from 1951 indicate that activities on the mill consisted of building and trestle repairs, ore bin construction, construction of a road to the ore bin, and construction of a tramway. There are no historic references concerning production quantities from this mill (USFS 2003), although records do indicate that $40,000 in gold and silver was extracted between 1905-1906 (USFS 2002a). This may have occurred from an earlier version of the mill however, since it was located in 1916.

The Ajax group includes 4 portals. The main one is approximately 500 ft long and is located along Lucas Gulch, with a lesser, collapsed adit located approximately 100 ft upgradient to the northeast. The remaining 2 are located further uphill, 1 on the Ajax No. 1 claim and 1 the Snowbird claim (Koch 1959).

Waste Characteristics

There can be a variety of mine waste problems, with the most difficult one to address being AMD. AMD results from both surface and underground mine workings, waste and tailings piles, and settling ponds. Except for tailings, all are present at the Magnolia and Ajax Mine (Durkin, Herrmann 1994).

In the presence of oxygen and water, sulfide oxidizes to create what is commonly referred to as "yellow boy" (iron hydroxide), sulfate, and hydrogen ions. The release of hydrogen ions causes the water to become acidic. AMD is characterized by the presence of the following:

- Low pH and increased acidity
- Elevated heavy metal concentrations, sulfates, and total dissolved solids (TDS).

The low pH of the water causes the metals within the mine and waste rock to become soluble. The receiving environment is effected by the low pH and high metal concentrations in the water. (Durkin, Herrmann 1994)

2.3 PREVIOUS INVESTIGATIONS

Magnolia Mine

The U.S. Environmental Protection Agency (USEPA) performed SIs of 12 mine sites located within the Granite Creek Watershed in October 1996 (USEPA 1997a). The Magnolia Mine was a part of this investigation. Seven sample locations were selected and surface water and sediment samples collected at each of them. The locations were at the lower adit portal, the western adit portal, in each of the settling ponds, and at upstream, onsite, and downstream locations on Lucas Gulch.

All the samples were analyzed for metals and evaluated against media-specific screening guidelines. Four sediment sample guidelines were used and consisted of the severe and low effect levels of the Ontario Sediment Quality Guidelines, and two sets of criteria based on Apparent Effects Thresholds developed by the USEPA. Surface water sample guidelines were based on the State of Oregon and USEPA ambient water quality criteria (USEPA 1997b). Twelve metal analytes detected in the sediment samples exceeded at least one of the four guidelines. These included arsenic, cadmium, copper, chromium, cobalt, lead, magnesium, manganese, mercury, nickel, selenium, and zinc. In the surface water samples, only arsenic exceeded the guideline concentrations.

The Forest Service conducted an Abbreviated Preliminary Assessment (APA) of the Magnolia Mine in 2002. The APA was conducted to determine whether the potential exists for a release of hazardous contaminants to the environment, and to further characterize the site. The APA was performed in accordance with the guidelines provided by CERCLA.

During the APA, a visual inspection was conducted and samples from waste piles were field analyzed using a Niton 700 series X-Ray Fluorescence (XRF) spectrum analyzer. Arsenic was the only metals analyte found to exceed USEPA Region 9 Preliminary Remediation Goals (PRGs). AMD was observed flowing from the lower adit through a ditch into 2 settling ponds in series, and then into Lucas Gulch (USFS 2002b).

Ajax Mine

The 1996 USEPA SI for the Granite Creek Watershed also included the Ajax Mine. Sediment and surface water samples were collected from 5 locations consisting of the adit portal, the settling pond, and upstream, onsite, and downstream locations on Lucas Gulch.

The samples were analyzed for metals, and the same guidelines for both sediment and surface water were used (USEPA 1997a). In the sediment samples, 13 metal analytes exceeded one or more of the guidelines. These included arsenic, cadmium, cobalt, copper, cyanide, lead, magnesium, manganese, mercury, nickel, selenium, silver, and zinc. In the surface water samples only arsenic exceeded evaluation guidelines.

The Forest Service conducted an APA at Ajax Mine in 2002 for the same reasons an APA was conducted at the Magnolia Mine. The Ajax Mine APA also included using a Niton XRF spectrum analyzer to field analyze samples from the waste pile. The results indicated that arsenic and iron exceeded USEPA Region 9 PRGs (USFS 2002a).

No other type of sampling was conducted, but the APA also documented the existence of AMD flowing from the adit into Lucas Gulch via a settling pond, which is within the floodplain of the gulch (USFS 2002a).

Environmental Impact Statement (2002)

In 2002, the Forest Service also conducted an Environmental Impact Statement (EIS) on Granite Area Mining Projects, including the Magnolia and Ajax Mines. The Columbia River bull trout and Mid-Columbia steelhead, both of which occur in the Granite Creek watershed, are listed as threatened under the Federal Endangered Species Act. In addition, several of the streams within the watershed are on the State of Oregon 303(d) list of impaired waters, as stipulated by the Clean Water Act. Given these facts, an EIS was necessary when the Forest Service proposed to approve Plans of Operation on 16 mining claims located within the watershed.

The Plan of Operation for the Magnolia site, which was evaluated by the Forest Service under the EIS, involved occasional maintenance and assessment work. The equipment to be operated consisted of a backhoe, small cat, one-yard loader, air compressor, pick-up truck, and hand tools. Fuels would be stored out of the flood plain, and the small cabin on site would be used for storage.

The EIS evaluated water quality and fish and aquatic habitat as two key issues, and then compared the effects of three alternatives on these key issues. No sampling was conducted during the EIS, but the Upper Granite Creek drainage was evaluated on the two key issues as a part of the larger watershed. (USDA 2002).

3. PATHWAY AND ENVIRONMENTAL HAZARD ASSESSMENT

3.1 GROUNDWATER PATHWAY

3.1.1 Geology

The Magnolia and Ajax Mines occur in the Granite Mining District, within the Elkhorn Mountains area of the Blue Mountains geomorphic province. The lode mines of the Granite District lie along the southwestern edge of the Bald Mountain batholith, a large granodiorite body of Jurassic-Cretaceous age with an outcrop area of more than 170 square mi. The principal lode mines occur in a northeast-trending belt of veins and mineralized shear zones about 2 mi wide and 5 mi long (Brooks and Ramp 1968). The veins occur primarily in older argillite of the Elkhorn Ridge Argillite, but a few cut the granodiorite of the batholith. With very few exceptions, the veins of the Granite District strike northeast and dip steeply either east or west.

Production at the Magnolia Mine was from quartz lenses and stringers in a zone of crushed and locally silicified argillite (Brooks and Ramp 1968). The Magnolia vein reportedly averages 4.5 ft in width and occurs at a strike of N 60° E and dip of 70° SE. At one point within the lower tunnel, the vein is offset 17 ft to the north by a cross-fault. Based on the occurrence of the quartz vein within this area, the faulting occurred during or before mineralization (Koch 1959). Sulfides present include pyrite, arsenopyrite, and marcasite. According to Brooks and Ramp (1968), about 15-20 percent of the gold occurred as free gold. Koch (1959) describes the Magnolia Mine as consisting of an adit extending approximately 1,050 ft with a portal near the level of Lucas Creek, and shorter adits and pits on the hillside northeast of the creek. According to Brooks and Ramp (1968), of the 3 adits at the mine, the lowest and longest extended approximately 1,000 ft and reached 280 ft below the outcrop.

Production at the Ajax Mine was from 2 shear zones, 1 in. to 5 ft thick and composed of brecciated argillite containing thin seams of quartz and calcite (Brooks et al. 1982). A small amount of pyrite is present. The Ajax vein occurs at a strike of about N 70°E and dip of 47° to 63° SE. The intersecting Snowbird vein strikes about N 10° E and dips westerly. The Ajax vein was developed by drifts on 3 levels, and the Snowbird vein was developed by drifts on 2 levels (Koch 1959). The primary production reportedly occurred from a 90-ft shoot on the Ajax vein (Koch 1959).

3.1.2 Hydrogeology

No discussion or documentation of groundwater conditions at the site or in the site vicinity were found. Shallow groundwater likely does not form a laterally continuous aquifer in the study area due to the presence of igneous intrusions and shallow bedrock. Localized shear zones and faults may also control groundwater flow to some extent. Shallow groundwater in the site area likely flows into Lucas Gulch.

No groundwater samples were collected during the SI; however, water samples were collected from the discharges at 2 adits at the Magnolia Mine and from 1 adit at the Ajax Mine. Because these discharges impact local surface water quality, analytical results for these samples are discussed with the surface water samples in Section 3.2.5.

3.1.3 Groundwater Targets

The target distance for groundwater has been defined as a 4-mi radius from the sites (Plate 1). Potential receptors include drinking water wells and wellhead protection areas. One well is located within a 4 mi radius of the sites, based on a search of the Oregon Water Resources Department database (OWRD) for

water wells (OWRD 2003). According to OWRD records, this well was installed in 1994 for a town of Granite resident. First water reportedly was encountered at a depth of 24 ft during drilling. The well was completed to a depth of 340 ft and the static water level, as measured upon well completion, was 22 ft. The well, located approximately 3.25-3.5 mi (areal distance) from the sites, is used for domestic purposes (OWRD 2003). There are no wellhead protection areas within a 4-mi radius of the site.

3.1.4 Groundwater Pathway Summary

Based on the available information, no release of hazardous substances from either mine site to local groundwater systems is suspected. The use of groundwater for drinking water within the target area is limited to 1 well, located between 3-4 mi from the sites. Considering the depth of the well and the distance from the sites, it is very unlikely that this well could be impacted from groundwater coming from the sites. Therefore, the groundwater pathway appears to be incomplete. Groundwater that discharges from the adits may impact nearby surface water bodies; these sources are discussed in the following sections.

3.2 SURFACE WATER PATHWAY

3.2.1 Hydrologic Setting

Both mine sites are situated along Lucas Gulch, approximately 0.5 mi above the confluence with Granite Creek. From the confluence point, Granite Creek flows approximately 14.4 mi to the confluence with the North Fork John Day River.

The Granite Creek watershed encompasses approximately 120-150 square mi (Weston 1997), with headwaters originating in the Blue Mountains. There are no stream gaging stations located in the study area (USGS 2003). However, most of the total water yield in the area occurs as snowmelt in May and June, and, except for periodic and localized thunderstorms, rainfall is generally sparse from July to September. Therefore, summer base flows are low relatively compared to the spring snowmelt period. The average annual precipitation ranges from about 10 in. in the lower valleys to 45 in. in the mountains (Brooks et. al. 1968). In the study area, annual rainfall is roughly 30 in., about half of which falls as snow (Koch 1959).

The hydrologic functioning of Granite Creek and many of its tributaries has been highly impacted by historical dredge mining. This in turn has significantly altered stream channel morphology and hence floodplain functionality (USDA 2002). The following observations were made during the SI field investigation regarding the hydrology near the mine sites:

- **Magnolia Mine.** The discharge flowing from the eastern adit empties into 2 settling ponds in series. The lower of the 2 ponds is engineered to drain into the creek; however, at the time of the SI, the flow was simply infiltrating into the bottom of the pond. The western adit discharges mine drainage directly into Lucas Gulch.

- **Ajax Mine.** AMD from the lower adit drains from the portal through an outflow pipe and into a narrow settling pond. The pond, which is approximately 6 ft deep, is situated on top of a waste rock pile. Seeps located at the toe of the pile flow overland and into Lucas Gulch. The soil along this overland route was humic and not notably stained. The area immediately to the southeast was heavily stained and likely represented a previous overflow or breach event.

3.2.2 Surface Water Targets

A target distance of 15 mi downstream has been identified for the surface water pathway. The surface water drainage route is shown on Plate 2. Potential targets include surface water intakes supplying drinking water, fisheries, sensitive environments (e.g., wetlands), and aquatic species of concern. The 15-mi target distance limit (TDL) for the mines extends along Lucas Gulch downstream from Ajax Mine 0.4 mi to its confluence with Granite Creek, along Granite Creek 14.4 mi to its confluence with the North Fork John Day River and another 0.2 mi on the North Fork John Day to the end of the TDL. The last 2.4 mi of the TDL are within the North Fork John Day Wilderness Area, and include reaches of both Granite Creek and the North Fork John Day River.

Because the TDL extends into a designated federal Wilderness Area, there appears to be few human targets. The only town along the TDL is Granite, which obtains its drinking water from an improved spring in the area (Weston 1997). There are no designated, developed campsites within the TDL; however there are numerous dispersed campsites located along open roads outside the Wilderness Area as well as primitive campsites inside the Wilderness Area. A dispersed campsite is one developed by the user, is typically located next to an open road, and often consists of a parking spot and a fire ring.

With the exception of tribal fishing, the TDL does not support commercial fishing activities, and the Oregon Department of Fish and Wildlife (ODFW) has prohibited all recreational fishing in Granite Creek and its tributaries (including Clear Creek) since 1997 in order to protect Chinook salmon (USEPA 1997a). In addition to Chinook, Granite Creek supports populations of steelhead trout, redband trout, westslope cutthroat trout, dace, mountain whitefish, and sculpin. Bull trout have also been recorded in the upper headwaters (USDA 2002).

Sensitive Environments

The sensitive environments present within the 15-mi TDL include:

- North Fork John Day Wilderness Area
- North Fork John Day Wild and Scenic River
- Migratory pathways and spawning areas critical to the maintenance of anadromous fish species
- Habitat potentially used by federal-designated threatened species and Species of Concern (SOC)
- Wetlands as defined by 40 CFR 230.3.

Prior to conducting the fieldwork, a list of threatened and endangered (T&E) species and SOC potentially occurring in Grant County was generated, obtained from the Oregon Natural Heritage Program (Appendix E, Table E-1, ONHP 2001). In addition, the Oregon Natural Heritage Information Center (ONHIC) was contacted regarding any specific recorded observations of rare or T&E species within a 2 mi radius of the sites (the search range available from the OHNIC (2003).

The aquatic species observed in the vicinity of the Magnolia and Ajax Mine sites during the SI are presented in Appendix E, Table E-2. Two federal-listed threatened species were noted within a 2-mi radius of the project area (the area reported by ONHIC) and may exist in Lucas Gulch: bull trout (*Salvelinus confluents*) and steelhead (*Oncorhynchus mykiss*). These species are designated by the State of Oregon as sensitive-critical (bulltrout) and sensitive-vulnerable (steelhead). The westslope cutthroat trout (*Oncorhynchus clarki lewisi),* designated as a federal-SOC and state-vulnerable species, was also reported as observed within 2 mi of the sites by the ONHIC.

Redband trout (*Oncorhynchus mykiss* sp.) and possibly cutthroat trout were observed in Lucas Gulch during the SI (refer to Section 3.2.4). Bull trout were not observed in Lucas Gulch, but were found along the upper portions of Granite Creek during the SI field investigation conducted in that area prior to the Ajax/Magnolia field investigation (EA 2003d).

Birds and Waterfowl

Species of birds that are associated with the streams and ponds are of concern due to their potential exposure to contaminants released from the mines. During the SI, no waterfowl were observed in the vicinity of the sites. The only bird species observed along Lucas Gulch was the American Robin (*Turdus migratorius*), which is a sentinel species often used in ecological risk assessments due to its eating and foraging habits. All the other bird species observed were in the forested hillsides surrounding the sites. Bird species observed during the SI are listed on Table E-2 (Appendix E). Other notable species observed in the vicinity of the sites include:

- Red-tailed Hawk (*Buteo jamaicensis*)
- Hairy Woodpecker (*Picoides villosus*)
- Audubon's Warbler (*Dendroica coronata*)
- Common Raven (*Corvus corax*).

Because it was past the nesting season at the time of the survey, no nesting activity was observed. The time of the year also reduced the amount of songbird activity, although half a dozen species were heard singing in the surrounding forest. All of the species observed could have exposure to contamination from the mines from a variety of sources, through dermal contact with potentially contaminated tailings, water, or sediment, to the ingestion of water, sediment, or prey.

Wetlands Assessment

The National Wetlands Inventory (NWI) 7.5-minute topographic map for the Granite quadrangle (USFWS 1994) was examined and compared to wetlands observed in the project area. For a detailed description of these wetlands and definitions, refer to Appendix F. Lucas Gulch is characterized as *Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded*, along with most of the permanent streams in the area. While this classification generally does not meet the CERCLA definitions of a wetland, the upper and lower reaches of Lucas Gulch are mapped with *Palustrine emergent vegetation and scrub-shrub vegetation* classifications that do. In addition, a number of palustrine ponds are situated on Granite Creek downstream of the confluence with Lucas Gulch. It is estimated that approximately 2 mi of the 15-mi TDL are wetlands, including 1.5 mi on Granite Creek above the Town of Granite.

Onsite wetlands at the Magnolia Mine consisted of the wet meadows at the north end of the site, near the cabin. Based upon the plants observed, these meadows ranged from wet to seasonally-wet fields, and were estimated to be approximately 1,000 ft^2 in size. They are classified as *either Palustrine Emergent Bed Saturated* (PEMB) or *Palustrine Emergent Bed Seasonally Flooded* (PEMC). Onsite wetlands at the Ajax Mine included a small (approximately 75 ft^2) wetland located in the vicinity of the seep at the base of the waste rock pile, near sample location AJAX-08. In addition, a small wetland classified as *Palustrine Scrub Shrub Seasonally Flooded* (PSSC) is located at the confluence of Lucas Gulch and Granite Creek. This area was estimated to be approximately 300 ft^2, but may vary due to periods of drought.

3.2.3 Stream Sampling Locations

Locations of stream samples at the Magnolia and Ajax Mines collected during the SI are indicated on Figures 1 and 2, respectively. Photographs of selected sample locations are provided in Appendix B. The impact of the Magnolia and Ajax Mines in relation to the other potential mines located along Lucas Gulch was evaluated by sampling stream locations above, between, and below the mine sites. Granite Creek was also sampled above and below its confluence with Lucas Gulch in order to measure the contaminant impact of Lucas Gulch on Granite Creek.

Upstream reference site locations for benthic macroinvertebrate and analytical sample collection are intended to provide data from a site not impacted by the Magnolia or Ajax Mines for comparison to data collected within the potentially impacted site. Station MAGN-01 was chosen as an upstream reference site (upstream of the Magnolia Mine) to compare to the stations downstream of the Magnolia and/or Ajax Mines.

Station MAGN-03 was chosen as the reference site for the Ajax Mine site. While inputs from the Magnolia Mine could affect this reference site, it allows an assessment of conditions before the influence of the Ajax Mine site.

Magnolia Mine

The sample locations associated with the Magnolia Mine are presented on Figure 1. One reference location (MAGN-01) and 1 location on Lucas Gulch downstream of the Magnolia Mine site (MAGN-02) were sampled for the SI. In addition, sample stations were also located at the adits and in the settling pond on the east side of Lucas Gulch to document potential impacts and migration of contaminants coming from the adits. The following stations were sampled:

Station ID	Location	Matrices Sampled
MAGN-01	On Lucas Gulch, upstream of Magnolia mining activities.	One surface water sample, 1 pore water sample (pool), and 1 sediment sample (pool habitat)
MAGN-02	On Lucas Gulch, immediately downstream of mining activities and the discharge coming from the adit on the west side of the creek and the settling pond.	One surface water sample, 1 pore water sample (pool), and 1 sediment sample (pool habitat)
MAGN-03	On Lucas Gulch, approximately 125 meters downstream of MAGN-02 and upstream of the Ajax Mine site. This station serves as a downstream station for Magnolia Mine and an upstream (reference) station for Ajax Mine.	One surface water sample, 1 pore water sample (pool), and 1 sediment sample (pool habitat)
MAGN-13	Along the drainage route from the main adit on the east side of Lucas Gulch.	One surface water sample
MAGN-11	In the settling pond which collects AMD from the main adit and discharges to Lucas Gulch.	One surface water sample and 1 sediment sample
MAGN-55	Along the drainage route from the adit located on the west side of Lucas Gulch. The sample was collected as close to the mouth of the adit as possible.	One surface water sample was collected

NOTE: AMD = Acid mine drainage.

Ajax Mine

The sample locations associated with the Ajax Mine are presented on Figure 2. One reference stream location (MAGN-03), and 1 location along Lucas Gulch downstream of Ajax Mine were sampled for the SI. In addition, samples were collected from the adit discharge, the settling pond, and the discharge route from the settling pond to Lucas Gulch. Two samples were also collected from Granite Creek to document contaminant input to Granite Creek from the mine sites upstream of the confluence with Lucas Gulch. One sample was collected from upstream of the confluence and 1 sample from below. The following stations were sampled:

Station ID	Location	Matrices Collected
AJAX-04	On Lucas Gulch immediately downstream of mining activities and the discharge from the settling pond.	One surface water sample, 1 pore water sample (pool habitat), and 2 sediment samples (pool and riffle habitat).
AJAX-07	On the east side of the road along the drainage route from the adit, prior to draining through the culvert that leads under the road.	One surface water sample
AJAX-06	In the settling pond which collects AMD from the adit and discharges to Lucas Gulch.	One surface water sample and 1 sediment sample
AJAX-52	In a marshy area along the drainage route from the settling pond to Lucas Gulch..	One surface water sample and 1 sediment sample
GRAN-53	On Granite Creek, upstream of its confluence with Lucas Gulch and upstream of where the road crosses the creek. This sample location is the reference station on Granite Creek.	One surface water sample, 1 pore water sample (pool), and 2 sediment samples (pool and riffle habitat)
GRAN-54	On Granite Creek, downstream of its confluence with Lucas Gulch. This sample location documents the contribution of contaminants from both the Magnolia and Ajax sites into Granite Creek.	One surface water sample, 1 pore water sample (pool), and 2 sediment samples (pool and riffle habitat)

3.2.4 Aquatic Survey Results

Aquatic surveys were conducted to assess the impact, if any, of the Magnolia and Ajax Mine sites on the benthic macroinvertebrate community, presence of fish species, and habitat quality. Survey results are presented in Appendix G (Tables G-1 through G-3). No significant fish barriers were found within the project area. General stream characteristics are presented in the following table:

Station	Habitat (%)			Dominant Substrate	Water Depth (in.)		Current Velocity (ft/sec)	
	Riffle	Pool	Run		Riffle	Pool	Riffle	Pool
Magnolia Mine								
MAGN-01	40	40	20	Silt/CPOM	NS	6	NS	0.00
MAGN-02	40	40	20	Cobble/Silt	NS	2	NS	0.00
MAGN-03	40	40	20	Gravel/Silt	NS	4	NS	0.03
Ajax Mine								
AJAX-04	70	20	10	Riffle – gravel Pool – silt	0.25-1	1-3.5	0.50	0.03
Granite Mine								
GRAN-53	30	40	30	Riffle – gravel and sand Pool – sand	2	6-7	0.93	0.03
GRAN-54	30	40	30	Sand	3.0-8.5	8-10	1.51	0.08

NOTE: CPOM = Coarse particulate organic matter.
NS = No sample.

Due to the small size of Lucas Gulch and the presence of bull trout (*Salvelinus confluents*), seining was not conducted at any of 4 locations on Lucas Gulch or the 2 on Granite Creek. Instead, the 6 locations were visually inspected for the presence of fish. Over a 4-day period, the following observations were made:

Area	Station No.	*Oncorhynchus* spp.
Magnolia Mine	MAGN-01	1
	MAGN-02	1
	MAGN-03	2
Ajax Mine	AJAX-04	1
Granite Creek	GRAN-53	7
	GRAN-54	4

At least 3 of the specimens observed appeared to be redband trout (*Oncorhynchus mykiss*), while the others were too small to identify to species, but were either redband trout or westslope cutthroat trout (*O. clarki*). Both species are federally listed as SOC and identified as vulnerable species by the Oregon Fish and Wildlife Commission. No other fish species were observed.

Lack of adequate pool habitat restricted benthic sampling in Lucas Gulch to only riffle areas, whereas in the larger Granite Creek, both riffles and pools were sampled. Field sampling and laboratory analysis were conducted in accordance with ODEQ methods (ODEQ 2001). The number and relative abundance of each taxa collected are provided in Tables G-1a, G-1b, and G-1c (Appendix G). The resultant data were evaluated using a multi-metric index developed by ODEQ (2001). Raw data and metric scores for the 10 metrics used by ODEQ are summarized in Table G-2. Examination of the index scores revealed no impacts to the Lucas Gulch or Granite Creek benthic communities from either the Magnolia or Ajax Mines. Specific observations pertaining to the data were as follows:

- Index scores at the sites adjacent to the 2 mines (i.e., Stations MAGN-02 and AJAX-04) were comparable to or higher than at the sites immediately upstream (i.e., Stations MAGN-01 and MAGN-03).

- Index scores, total taxa richness, mayfly richness, and stonefly richness all showed a weak trend of increasing values as one moves from upstream to downstream (i.e., from Station MAGN-01 to Station AJAX-04) in Lucas Gulch. These increases, if real, likely reflect changes in steam size rather than responses to anthropogenic inputs.

- Index scores at the 2 Granite Creek riffle stations were identical indicating that inputs from Lucas Gulch do not adversely affect macroinverebrates inhabiting riffles.

- Index scores at the 2 Granite Creek riffle locations were slightly to moderately lower compared to the Lucas Gulch riffle stations due primarily to noticeably lower scores for the percent tolerant taxa metric and the percent sediment tolerant metric. This suggests that Granite Creek may be carrying higher sediment loads or possibly certain contaminants. More sediment deposition was observed in Granite Creek during the habitat assessment supporting the idea that sediment transport in Granite Creek is high.

- The Index score for pool habitat in Granite Creek was noticeably lower at Station GRAN-54 (score of 24), downstream of the confluence with Lucas Gulch compared to Station GRAN-53 (score of 38) upstream of the confluence.

- This difference, if real, could be the result of several factors: toxic contaminants or high sediment loads from Lucas Gulch, or differences in pool quality between these 2 stations. It is also possible that the difference is not real, being an artifact associated with a one-time sampling effort.

- The fact that the Index scores for riffles in Lucas Gulch were higher than those in Granite does not support the toxicity hypothesis.

- The low index score at Station GRAN-54 coincides with elevated sediment concentrations of certain metals (refer to Appendix G, Table G-3).

Habitat conditions were evaluated at each of the 6 stream stations, in accordance with the methods stated in the project plans; habitat scores are presented in Table G-3. The following habitat conditions were noted:

- Habitat was good to excellent (score of 159-175) at all locations.

- Habitat was marginally better in Granite Creek than in Lucas Gulch due to Granite Creek being deeper, faster, and having less embeddness.

- Habitat does not appear to be limiting to benthic organisms at any of the sampling stations.

3.2.5 Analytical Results

Analytical water quality results for surface water, pore water, and sediment samples are presented in Tables 1, 2 and 3, respectively. Only those constituents detected in one or more samples are included in the summary tables. Dissolved metals concentrations were used for comparison with surface water screening criteria. Total metals concentrations for surface water samples are presented in a summary table in Appendix J, along with copies of the laboratory reports.

Field water quality parameters were measured in conjunction with sampling efforts. Surface water quality parameters were measured in riffle and pool habitat at each station. Pore water quality parameters were measured in water samples extracted from pool habitat (Table 2). Field water quality measurements for the surface water and pore water are reported in Tables 1 and 2, respectively.

- Field water quality parameters consisted of: hexavalent chromium, temperature (°C), dissolved oxygen (mg/l), specific conductance ($\mu S/cm^3$), pH (standard units), turbidity (NTU), redox potential (ORP) and current velocity (ft/s).
- The pH values at the adits at the Magnolia Mine site ranged from 7.3 to 8.0. The pH value at the Ajax Mine adit was 7.9. The pH values for the surface water and pore water in Lucas Gulch ranged from 8.4 to 8.7 at the Magnolia sampling stations and 8.1-8.7 at the Ajax sampling stations. The pond samples were also within this range.
- Field water quality measurements did not indicate that these parameters were a limiting factor that would preclude sustainable benthic macroinvertebrate and fish communities at any of the stream stations sampled.

Laboratory analyses performed include the following:

- Surface water – pH, Target Analyte List (TAL) metals (total and dissolved), arsenic III and V (total metals only), cyanide, TDS, total suspended solids (TSS) (TSS, organic, and inorganic), hardness, alkalinity, specific conductance, oxidation/reduction potential (Eh), and sulfate

- Pore water – Dissolved TAL metals, arsenic III and V (total metals only), and cyanide

- Sediment – TAL metals, cyanide, Total Organic Carbon (TOC), grain size, and clay mineralogy (for samples collected in pools only).

Criteria for comparing measured concentrations of metals in surface water and pore water consist of the following human health and ecological screening values:

- ODEQ Water Quality Criteria, Protection of Aquatic Life, Fresh Chronic Criteria (Oregon Administrative Record [OAR] 340-041-001); hardness-dependent values (cadmium, chromium III, copper, lead, nickel, silver, and zinc) were calculated based on the hardness for each sample, and the range of values is provided in the data tables.

- ODEQ Water Quality Criteria, Protection of Human Health, Water, and Fish Ingestion (OAR 340-041-001).

- ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values for surface water.

- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, chronic; hardness-dependent values were calculated separately for each sample.

- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, Tier II secondary chronic values calculated by Oak Ridge National Laboratory (Suter & Tsao 1996).

- USEPA (2002) recommended ambient water quality criteria for protection of human consumption of fish; hardness-dependent values were calculated separately for each sample.

- Oak Ridge National Laboratory, U.S. Department of Energy (Efromyson, et. al. 1997), PRGs.

Of these screening values, comparisons were made with the lowest value available. Results of the metals analyses for surface water and pore water are discussed in the following table and presented in Tables 1 and 2, respectively).

Summary of Surface Water, Pore Water and Sediment Metals Data

Sample Type	Table/ Sample Nos.	Dissolved Metals Exceeding One or More Comparison Criteria	Trends Observed and Comments
Surface Water	Table 1		
Magnolia – upstream	(MAGN-01)	Barium, mercury and selenium	
Magnolia – east adit	(MAGN-13)	Arsenic, barium, calcium, iron, manganese, nickel, and thallium	Arsenic, calcium, iron, manganese, and nickel were at notably high concentrations.
Magnolia – Pond	(MAGN-11)	Arsenic, barium, calcium, iron, manganese, mercury, and nickel	Of the metals detected above the comparison criteria, calcium, iron, manganese, and nickel were at notably high concentrations. These analytes were also detected at high concentrations in the east adit water sample.
Magnolia – west adit	(MAGN-55)	Barium	Not at a notably high concentration.
Magnolia – at the mine	(MAGN-02)	Arsenic and barium	Arsenic was notably higher than the reference concentration. Barium was at a comparable concentration.
Magnolia – downstream/ Ajax - upstream	(MAGN-03)	Arsenic, barium, and thallium	Arsenic was detected at a notably higher concentration than the reference sample concentration. Barium and thallium were comparable to the reference.
Ajax - adit	(AJAX- 07)	Aluminum, arsenic, barium, iron, lead, manganese, mercury, nickel, and selenium	Aluminum, arsenic, iron, lead, manganese, mercury and nickel were at notably high concentrations.
Ajax - pond	(AJAX-06)	Barium, manganese, and mercury	Manganese was detected at a high concentration and was also detected at very high concentrations in the adit water sample.
Ajax – overland route from waste pile to stream	(AJAX-52)	Arsenic, barium, iron, manganese, and mercury	Arsenic and iron were detected at notably high concentrations. Manganese was detected just above the comparison criteria.
Ajax – at the mine	(AJAX-04)	Arsenic, barium, lead, and mercury	All of the analytes were comparable to the reference sample concentrations (MAGN-03). Arsenic was detected at a concentration notably above the Magnolia reference sample (MAGN-01).
Granite Creek – upstream	(GRAN-53)	Arsenic, barium, and mercury	Barium and mercury were at similar concentrations to the Lucas Gulch reference sample. The concentration of arsenic was notably above the Lucas Gulch reference concentration (MAGN-01), but lower than the downstream sample concentrations on Lucas Gulch.
Granite Creek – downstream	(GRAN-54)	Arsenic, barium, and mercury	The concentrations were similar to the Granite Creek reference sample.
Pore Water	Table 2		
Magnolia – upstream	(MAGN-01)	Barium and mercury	
Magnolia – at the mine	(MAGN-02)	Barium and mercury	The concentrations of both barium and mercury were similar to the reference sample concentrations.
Magnolia – downstream/ Ajax - upstream	(MAGN-03)	Barium and mercury	The concentrations of both barium and mercury were similar to the reference sample concentrations.
Ajax – at the mine Granite Creek – upstream	(AJAX-04) (GRAN-53)	Barium Barium	The concentration was similar to the reference concentration. The concentration was lower than the Lucas Gulch reference sample concentration.
Granite Creek – downstream	(GRAN-54)	Barium and mercury	The concentrations of both barium and mercury were similar to the reference sample concentrations.

Criteria for comparing measured concentrations of metals in sediments consist of the following values:

- Threshold Effects Level (TEL) and Probable Effects Level (PEL) from USEPA National Sediment Quality Survey, Screening Values for Chemicals Evaluated http://www.epa.gov/waterscience/cs/vol1/appdx_d.pdf).

- Effects Range-Low (ER-L) and Effects Range-Medium (ER-M), National Oceanic and Atmospheric Administration (NOAA), from USEPA (1997) National Sediment Quality Survey, Screening Values for Chemicals Evaluated.

- ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values for freshwater sediment.

Similar to the surface water and pore water samples, the sediment results were compared to the lowest screening criteria available. The analytical results for the sediment samples are provided in Table 3 and are summarized in the following table.

Sample Type	Table/ Sample Nos.	Dissolved Metals Exceeding One or More Comparison Criteria	Trends Observed and Comments
Sediment	Table 3		
Magnolia – upstream	(MAGN-01)	Nickel	
Magnolia – Pond	(MAGN-11)	Antimony, arsenic, cadmium, copper, manganese, mercury, nickel, silver, and zinc	Arsenic, chromium, copper, manganese, nickel, and zinc were at notably high concentrations.
Magnolia – At the mine	(MAGN-02)	Arsenic, chromium, copper, mercury, and silver	Arsenic, chromium, mercury, and silver were notably above the reference sample concentrations.
Magnolia – downstream/ Ajax – upstream	(MAGN-03)	Antimony, arsenic, cadmium, copper, lead, manganese, mercury, nickel, silver, and zinc	Arsenic, lead, manganese, mercury, nickel, and zinc were notably above the reference sample concentrations.
Ajax – Pond	(AJAX-06)	Antimony, arsenic, cadmium, copper, manganese, mercury, nickel, and zinc	Arsenic, cadmium, copper, manganese, mercury, nickel, and zinc were at notably high concentrations. Cadmium, manganese, nickel and zinc were at the highest concentrations of all the sediment samples collected.
Ajax – overland route	(AJAX-52)	Antimony, arsenic, cadmium, copper, lead, manganese, mercury, nickel, silver, and zinc	Antimony, arsenic, copper, manganese, nickel, and zinc were at notably high concentrations. Of these, antimony and arsenic were at the highest concentrations of all the samples collected.
Ajax – At the mine	(AJAX-04)	Antimony (p), arsenic, cadmium (p), copper, lead (p), manganese, mercury, nickel, silver, and zinc (p)	Antimony, arsenic, mercury, and nickel were below the Ajax reference concentrations (MAGN-03), but higher than the Lucas Gulch reference concentrations (MAGN-01). The other metals were detected at concentrations which were higher than both the reference concentrations, though not significantly higher. It should be noted that all of the metals detected at concentrations above the comparison criteria in this sample were also detected at elevated concentrations in the overland route sample.
Granite Creek – upstream	(GRAN-53)	Arsenic, cadmium, lead, nickel, silver, and zinc	All concentrations were notably higher (in both pool and riffles) than the upstream reference sample concentrations on Lucas Gulch (MAGN-01).
Granite Creek – downstream	(GRAN-54)	Antimony, arsenic, cadmium, copper, lead, mercury (p), nickel, silver, and zinc	Arsenic, copper, lead, and silver were all higher than the Granite Creek (GRAN-53) and Lucas Gulch reference (MAGN-01) concentrations. Cadmium was just slightly higher than the reference sample concentrations.
NOTE: (p) = Detected in pool only.			

In sediment samples, the percentage of fine material (clay and silt) was higher in the 2 pond samples and in the sample collected along the overland route at the Ajax site. The sample collected at location MAGN-11, at the Magnolia lower pond, was composed of 93 percent fines. The sample collected at AJAX-06, at the Ajax pond, was composed of 86 percent fines and at AJAX-52, along the overland route, was composed of 47 percent fines. Sediments collected from the streambed were coarser and were composed primarily of gravel and sands.

3.2.6 Surface Water Pathway Summary

There is evidence of an ongoing release of arsenic to surface water from the Magnolia Mine site. In the surface water sample collected just downstream of site activities, additional metals detected at concentrations above the criteria included barium and thallium, though they were comparable to the reference concentrations.

Analytical data suggests that there is not an ongoing release of metals to the surface water at the Ajax site. Arsenic was detected at a concentration that was notably higher than the concentration in the surface water sample collected upstream of the Magnolia site, suggesting that arsenic is migrating downstream from the Magnolia site to this stream location.

Based on the analytical results, barium and/or mercury were detected at elevated concentrations in the pore water samples; however, the levels were similar to the reference concentrations.

Sediments in the vicinity of both the Magnolia and Ajax Mine sites are being impacted by potential sources at the sites, though sediments near the Ajax Mine appear to be slightly less impacted than those near the Magnolia site. The sediment samples with the most exceedences of comparison criteria were those from the ponds and the overland route from the seep below the waste pile at the Ajax Mine.

AMD was observed flowing from the east adit at the Magnolia site and the adit at the Ajax Mine. Red-colored staining was also observed coming from the pond at Ajax, as well as downgradient from a seep at the base of the waste rock pile near the creek. All stream and pond samples had neutral pH levels.

Examination of the index scores revealed no impacts to the Lucas Gulch or Granite Creek benthic communities from either the Magnolia or Ajax Mines. Furthermore, the habitat does not appear to be impacting the benthic community.

The redband trout (*Oncorhynchus mykiss*) and possibly the cutthroat trout (*O. clarki*) were observed in the vicinity of the sites. Both species are federally listed as SOC and identified as vulnerable species by the Oregon Fish and Wildlife Commission.

3.3 SOIL EXPOSURE PATHWAY

3.3.1 Targets

There are no residents living on site or within 200 ft of areas of suspected contamination related to the sites. There is still an active claim at Magnolia Mine however, and at least one person works at the site on an occasional basis. The lower settling pond had recently been drained and backhoe tracks were observed. In addition, a small cabin at the site was being used for storage. According to the USFS EIS performed in 2002, these activities are being conducted with the knowledge and approval of the USFS.

The closest building, a small cabin, is located approximately 0.6 mi from the Magnolia site and 0.4 mi from the Ajax site, although it is unknown whether this cabin is occupied on a regular basis. With the

exception of this cabin, the closest buildings are homes on the fringes of Granite, approximately 2.5 mi from the sites. The town of Granite is located approximately 3 mi from the sites (straight-line distance). It is reported that approximately 24 people live in the town of Granite (USCB 2002). Furthermore, it is estimated that there are approximately 50 permanent residents located within a 4-mi radius of the mine sites.

The road to the sites is gated and locked, and access is generally not an issue. Land uses in the site area include recreation (hiking, fishing, camping, etc.), mining on nearby claims, and limited timber harvesting.

Soil exposure targets also include sensitive environments located both onsite and within a 4-mi radius of the site and are discussed in Sections 3.3.2. The terrestrial sensitive environments within the 4-mi radius also include the North Fork John Day Wilderness Area.

3.3.2 Plant and Wildlife Surveys

Habitat reconnaissance surveys were conducted at the mine sites to establish existing habitat conditions, species composition, and the presence of wetlands and T&E species along Lucas Gulch and reference/background stations.

To accomplish the T&E species surveys, two approaches were used. While assisting with water sampling, sediment sampling, and vegetation sampling, the site was monitored for wildlife. In addition, flora was located during a later timed-meander-search (TMS) procedure. A simple classification, using the National Vegetation Classification System (NVCS), was conducted to determine the habitat types at the mine sites, typically the riparian and forested slopes being the major types (FGDC 1997). All observed species at the site were recorded on a field data sheet as they were encountered and unknown plant species were collected, preserved, and later keyed for identification using reference materials.

Site Habitat Description and Characterization

The habitat was characterized in the area of the 2 mine sites using the National Vegetation Classification Standards (NVCS) (FGDC 1997), combined with a simple habitat assessment to document dominant plant species observed including canopy and understory species. The following observations of the area were made:

- The mines are located within the small riparian zone along Lucas Gulch. This strip ranges from 10-15 meters wide and is bounded on both sides by extremely steep slopes.

- Using the NVCS system, the hillsides were classified as “woodland,” because the cover was less than 60 percent (II.A.4.N.b.).

- Vegetation type differs on the steep slopes due to orientation, however the dominant plant types on both were douglas fir (*Pseudotsuga menziesii*), and lodgepole pine (*Pinus contorta*). The hillside forest is typical for the Blue Mountain ecosystem (Franklin and Dyrness 1973), with large numbers of dead snags and near absence of understory. The understory species present consisted of grasses, forbs, and whortleberry (*Vaccinium scoparium*). The condition of the forest on the hillsides indicated a history of logging, fire, and possibly insect infestation.

- The riparian zone has extensive sections of dead willows, perhaps indicative of recent fires, but is dominated by alder (*Alnus rubra*) and dogwood (*Cornus stolonifera*) with a major understory of grasses, sedges, and horsetails.

- Lucas Gulch ranges from 3 to 10 ft wide in the vicinity of the mines and was not more than 1 ft deep. In spots in was slow moving and sluggish.

Vegetation

There are essentially 2 habitat types in the area of the sites:

- The steep slopes and hillsides on either side of Lucas Gulch
- The riparian zone along the valley floor.

Most of the surrounding hillsides are steep; the forest was in poor condition with over 25 percent dead snags in some places. Wild strawberry (*Fragaria virginiana*), the plant species selected for plant tissue collection (see below) was widespread in a variety of habitats.

Prior to conducting the fieldwork, a list of T&E plant species and SOC was generated, obtained from the Wallowa-Whitman National Forest (Appendix E, Table E-3). In addition, the ONHIC was contacted regarding any specific recorded observations of T&E plant species and SOC within a 2-mi radius of the sites (the search range available from the ONHIC). Two species of *Carex*, northern sedge (*Carex concinna*) and meadow sedge (*Carex praticola*), were noted in the search (OHNIC 2003). These sedge species are not a Federal- or State-listed species, but are considered sensitive and are not commonly found in the area. No T&E species or SOC on the Wallowa-Whitman list were observed during the SI. The plant species that were observed during the SI are listed on Table E-4 (Appendix E).

The understory vegetation along Lucas Gulch is generally nonvascular with the primary species being horsetails (*Equisetum* sp.) with forbs and fewer grasses. There are a few areas of scrub-shrub (mostly alder with some red-osier dogwood) occurring at the confluence with Granite Creek. The NVCS code for the riparian area would be a temporarily flooded cold-deciduous shrubland (III.B.2.N.d.).

Wildlife

Prior to conducting the fieldwork, a list of T&E wildlife species and SOC potentially occurring in Grant County was generated with data obtained from the OHNP (Appendix E, Table E-1). In addition, the ONHIC was contacted regarding any specific recorded observations of T&E wildlife species and SOC within a 2-mile radius of the sites (Appendix D). The search indicated that the spotted frog (*Rana luteiventris*), a federal and state sensitive species, has been documented within 2 mi of the sites.

The species observed in the vicinity of the Magnolia and Ajax Mine sites during the SI are listed in Table E-2. Very few wildlife species were observed at either site. Three species of mammals, and no reptiles or amphibians were observed. The mammal observations consisted of a vole (*Microtus* sp.), yellow pine chipmunk (*Eutamias amoenus*), and the scat of mule deer (*Odocoileus hemoionus*). No terrestrial T&E species or SOC were observed during the SI.

Birds and Waterfowl

All the bird species observed were associated with the hillside forests; no waterfowl were observed during the SI. The only species observed along Lucas Gulch was the american robin (*Turdus migratorius*). Observations of the other birds consisted mostly of hearing the calls from the surrounding forest, primarily mountain chickadee (*Poecile gambeli*), western tanager (*Piranga ludoviciana*), and golden-crowned Kinglet (*Regulus satrapa*).

3.3.3 Sample Locations

Background Locations

A total of 4 background surface soil samples were collected outside of the influence of the Magnolia and Ajax Mine sites. The samples were collected at approximately 0.5 ft below ground surface (bgs).

- Three samples were collected in the vicinity of the upper Granite Creek watershed during the Granite Creek SI (GRAN-34, 35, and 36; EA 2003d).

- One sample was collected near the Magnolia site (LUCA-19). The sample was located just inside the woods at the edge of the meadow, to the north of the collapsed cabin. This area of the site was presumed to be outside of the influence of mining activities.

3.3.3.1 Soil and Waste Samples

The locations of the soil and waste samples are described below.

Magnolia Mine

Three surface soil and/or waste samples were collected at the Magnolia Mine during the SI:

- One sample was collected from the lower settling pond (MAGN-12). The sample was collected from the red "sludge" material at approximately 0.3 ft bgs. Below the layer of red sludge there was a layer of grey material with gravel.

- One sample was collected in the vicinity of the former stamp mill (MAGN-15). The sample was collected from 0.5 ft bgs.

- One sample was from the waste pile near the ponds (MAGN-16) and Lucas Gulch. The sample was collected from approximately 0.5 ft bgs.

Three subsurface soil and/or waste samples were collected:

- One sample was collected from the waste pile located near the upper collapsed portal (MAGN-14). The sample was collected from the edge of the slope from approximately 2.5 to 3 ft bgs.

- One sample was collected approximately 10 ft downhill of the waste pile near the upper collapsed portal (MAGN-18). The sample was collected from approximately 1 to 1.5 ft bgs.

- One sample was collected at the waste pile located at the southern end of the site just upgradient of Lucas Gulch (MAGN-17). The sample was collected from approximately 1.5 to 2 ft bgs.

Ajax Mine

Three subsurface soil and/or waste samples were collected at the Ajax Mine site:

- One sample was collected from the waste rock pile located near the upper adit (AJAX-10). The sample was collected at approximately 2 ft bgs.

- One sample was collected from the waste rock pile located near the settling pond and adjacent to the creek (AJAX-09). The sample was located along a path of stained soil coming from the pond, possibly where water has overflowed from the pond.

- One sample was collected at the toe of the waste rock pile, along the runoff channel from the seep (AJAX-08).

3.3.3.2 Plant Tissue Samples

Plant tissue specimens were collected from 3 onsite stations at Magnolia Mine, 2 onsite stations at Ajax Mine, and 4 background stations. Three of the background stations were located on the hillsides within the Granite Creek drainage, but outside of the mining activity. One of the background stations was located within the Lucas Gulch drainage. There were often only a few plant species available on the waste piles and tailings, and many in very small densities. The targeted plant species, wild strawberry (*Fragaria virginiana*), was chosen because it occurred on the often barren waste piles and it is both browsed by wildlife and its fruit eaten by many organisms. This species exhibited stressed vegetation signs at the onsite locations. Visual stress indicators included yellow leaves with green veins (which could indicate toxicity or lack of nutrients), leaves with brown tips (which could indicate burning), and stunted growth (as compared to plants in background areas).

While wild strawberry is not the most important browse or fruit species, its prevalence on the waste piles and other locations impacted by mining make it a potentially useful species for future use in a food chain analysis of ecological risks. Another strawberry species that was observed in the area of the sites was *Fragaria vesca*. Speciation of strawberries were difficult to determine without flowers or fruit.

Plant tissue specimens were collected from the following locations and were co-located with the corresponding soil samples:

- Three stations at the Magnolia Mine site (MAGN-11, 14 and 17)
- Two stations at the Ajax Mine site (AJAX-06 and 08)
- Four background areas (GRAN-34, 35 and 36 and LUCA-19).

3.3.4 Analytical Results

All soil and/or waste samples collected at the Magnolia and Ajax Mines were analyzed for pH, TAL metals, chromium VI, and cyanide. Synthetic Precipitation Leaching Procedure (SPLP) and Acid Base Accounting (ABA) parameters were also included as appropriate. Criteria for comparing measured concentrations of metals in soils consisted of the following human health and ecological screening values:

- ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values
- USEPA Region 9 PRGs for Industrial Soils (http://www.epa.gov/region09/waste/sfund/prg/index.htm)
- USEPA (2000a) Generic Soil Screening Levels (SSLs), for protection of human health
- USEPA (2000b) Ecological Soil Screening Levels (EcoSSLs)
- Oak Ridge National Laboratory PRGs for protection of plants, wildlife, or soil invertebrates, U.S. Department of Energy (Efroymson et al. 1997).

Analytical data were compared to the lowest available screening criteria.

The plant tissue samples were analyzed for cyanide and TAL Metals. No comparison criteria are available for plant tissue; these data may be used in a food chain model, if required in the future. The plant tissue samples were compared to background samples for discussion purposes.

Surface and Subsurface Soil/Waste Rock Samples

A summary of the surface and subsurface soil/waste samples is provided in Table 4. Soil sample descriptions are provided in Appendix I. Surface and subsurface soil sample analytical results are summarized below.

Sample Type	Table/ Sample Nos.	Metals Exceeding One or More Comparison Criteria (in at least one sample)	Metals Notably Above Highest Background Concentration (in at least one sample)	Trends Observed and Comments
Soil/Waste Rock	**Table 4**			
Background				
Surface Soil	GRAN-34, GRAN-35, GRAN-36 and LUCA-19	Aluminum, arsenic, barium, beryllium, chromium, manganese, mercury, selenium, vanadium, and zinc.	NA	In general, some of the higher concentrations were detected in the soil sample collected near Lucas Gulch (Plate 2).
Magnolia Mine				
Surface Soil/Waste Rock:	MAGN-12, MAGN-15, and MAGN-16	Aluminum, antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc	Antimony, arsenic, cadmium, cobalt, copper, iron, lead, manganese, mercury, nickel, selenium, silver, thallium, and zinc	Of the metals detected at concentrations above the comparison criteria in surface soil samples, aluminum, barium, beryllium, chromium and vanadium were comparable to the background concentrations. In general, the highest concentrations were detected in the sample collected from the lower settling pond (MAGN-12).
Subsurface Soil/Waste Rock:	MAGN-14, MAGN-17, and MAGN-18	Aluminum, antimony, arsenic, barium, beryllium, chromium, copper, lead, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc	Arsenic, lead, mercury, nickel, selenium, silver, and thallium.	Of the metals detected at concentrations above the comparison criteria in surface soil samples, aluminum, barium, beryllium, and chromium were comparable to the background concentrations. In general, some of the highest concentrations were detected in the sample collected from the waste pile located near the upper collapsed portal (MAGN-14).

Sample Type	Table/ Sample Nos.	Metals Exceeding One or More Comparison Criteria (in at least one sample)	Metals Notably Above Highest Background Concentration (in at least one sample)	Trends Observed and Comments
Ajax Mine				
Subsurface Soil/Waste Rock:	AJAX-08, AJAX-09, and AJAX-10	Aluminum, antimony, arsenic, barium, beryllium, chromium, copper, manganese, mercury, selenium, thallium, vanadium, and zinc	Antimony, arsenic, and mercury	Of the metals detected at concentrations above the comparison criteria, aluminum, barium, beryllium, and chromium were comparable to the background concentrations.

NA – Not applicable.

Plant Tissue Samples

A summary of the plant tissue sample results is provided in Table 5. Currently, no comparison criteria are available for plant tissue. The analytical results are discussed in the following table:

Sample Type	Table/ Sample Nos.	Metals Exceeding Background Concentrations (in at least one sample)	Metals Notably Above Highest Background Concentration (in at least one sample)	Trends Observed and Comments
Plant Tissue	**Table 5**			
Background				
Plant Tissue	GRAN-34, GRAN-35, GRAN-36, and LUCA-19	NA	NA	Antimony, arsenic, cobalt, and mercury were not detected in any of the background samples.
Magnolia Mine				
Plant Tissue	MAGN-11, MAGN-14 and MAGN-17	Aluminum, arsenic, iron, lead, magnesium, selenium, and zinc were detected above the background sample concentrations.	Arsenic and iron.	With the exception of magnesium and iron, all of the metals detected above background in the plant tissue samples were also detected above the comparison criteria in the colocated soil samples at MAGN-14 and MAGN-17. Arsenic was detected in the co-located soil samples at concentrations notably above background.
Ajax Mine				
Plant Tissue	AJAX-06 and AJAX-08	Arsenic, iron, lead, magnesium, and selenium were detected above the background sample concentrations.	Arsenic and iron.	Arsenic and selenium were also detected above the comparison criteria in the colocated soil sample collected at AJAX-08, although selenium was not at a notably high concentration.

NA – Not applicable

3.3.5 Soil Exposure Pathway Summary

There is evidence of releases of site-related contaminants to soil at the Magnolia and Ajax Mine sites. A number of metals were detected in onsite surface soil and waste rock pile samples at concentrations exceeding comparison criteria. Although 10 metals were detected at concentrations above the comparison criteria in the background surface soil samples, a number of metals were detected in surface and/or subsurface samples at both sites at concentrations exceeding the comparison criteria and at elevated concentrations compared to background:

- Antimony, arsenic, barium, cadmium, chromium, copper, lead, manganese, mercury, selenium, silver, thallium, vanadium, and zinc at the Magnolia Mine site. Overall, it appears that the highest concentrations of metals were detected in the samples collected from the lower pond (MAGN-12), the waste pile near the upper eastern collapsed adit (MAGN-14), and the mill site (MAGN-15). Most notably, arsenic, mercury, nickel, and zinc were detected at very high concentrations in the surface soil sample collected in the lower pond (MAGN-12).

- Antimony, arsenic, and mercury at the Ajax Mine site. No specific trends were noted.

Plant tissue samples also contained concentrations of metals that exceeded both the comparison criteria and background concentrations. At both mine sites, only arsenic was detected in both the plant tissue and the co-located soil samples at concentrations above the comparison criteria.

Erosion of fine-grained waste material was evident at both mine sites adjacent to the waste piles along Lucas Gulch. These eroded waste materials would enter the creek during periods of high rainfall and snowmelt.

No listed terrestrial T&E species or SOC were observed within the project area at either site during the SI.

3.4 AIR PATHWAY

3.4.1 Targets

The target distance for air has been defined as a 1 and 4 mi radii from the site. It is estimated that 50 people live within 4 mi of the sites. The shortest distance from any potential sources of contamination onsite to any residence or regularly occupied building is estimated to be approximately 0.6 mi from the Magnolia Mine and 0.4 mi from the Ajax Mine, although it is unknown whether this cabin is occupied on a regular basis and may be related to local mining operations. It is estimated that there is 1 residence within 1 mi of the Magnolia and Ajax Mine sites.

There were few wetlands identified on the wetland maps within a 4 mi radius of the mine sites, due to the mountainous habitat surrounding the sites. It is estimated that less than 1 percent, or 320 acres, of the area within 4 mi of the sites are characterized as wetlands (USFWS 1994). In the immediate vicinity of the mines, there are few other wetlands. The North Fork John Day Wilderness Area, considered a sensitive environment, is located within a 4-mi radius of the sites.

3.4.2 Air Pathway Summary

- Air samples were not collected as part of this SI. The most likely air pathway at the mine sites is through inhalation of particulate matter. The air pathway is considered complete for the Magnolia site, as arsenic was detected in 2 shallow soil samples at concentrations exceeding the USEPA soil screening level for inhalation of particulates. Because the air pathway is directly related to the soil pathway, reducing or eliminating contaminated soils at the site would likely render the air pathway incomplete. Further assessment of the air pathway is not considered necessary, if the soil pathway is addressed.

4. SUMMARY AND CONCLUSIONS

Based on site observations and the results of field and laboratory analyses, the following site characteristics and conclusions have been identified:

Groundwater Pathway

- The use of groundwater for drinking water within the target area is limited to 1 well, located between 3-4 mi from the sites. Considering the depth of the well and the distance from the sites, it is very unlikely that this well could be impacted from groundwater coming from the sites. Any impacted shallow groundwater at the site is expected to be very localized in nature, and to present a risk to nearby surface water bodies, in the form of springs and seeps. Therefore, the groundwater pathway appears to be incomplete.

Surface Water Pathway

- A number of metals were detected at concentrations above the comparison criteria in the water samples collected at the east adit and the upper retention pond at the Magnolia Mine. A number of metals were also detected at elevated concentrations in the sample collected from the adit at Ajax Mine.

- There is evidence of an ongoing release of arsenic from sources at the Magnolia Mine to surface water in Lucas Gulch. Based on the results, arsenic is migrating downstream from the Magnolia site to the onsite stream station at Ajax Mine. The results suggest that there is not an ongoing release of metals from potential sources to surface water at the Ajax Mine.

- Based on the analytical results, metals from the mine sites are not impacting the pore water in the project area.

- The analytical results indicate that contaminants from the sites are not impacting surface water in Granite Creek.

- Sediments in the vicinity of both the Magnolia and Ajax Mine sites are being impacted by potential sources at the sites. The stream sediment samples collected at the Magnolia site had higher concentrations of metals in comparison to the Ajax site. The sediment samples with concentrations that had the most exceedences of comparison criteria were those from the ponds and the overland route from the seep below the waste pile at the Ajax Mine.

- The redband trout (*Oncorhynchus mykiss*) and possibly the cutthroat trout (*O. clarki*) were observed in Lucas Gulch in the vicinity of the sites. Both species are federally listed as SOC and identified as vulnerable species by the Oregon Fish and Wildlife Commission. It is possible that these species are being impacted by the mines, however, this has not been determined.

Soil Exposure Pathway

- A number of metals were detected in surface and/or subsurface soil samples at concentrations exceeding comparison criteria at both mine sites. Overall, the highest concentrations of metals in soil and waste samples at the Magnolia Mine were detected in the samples collected from the

lower pond, the waste pile by the upper east collapsed adit (MAGN-14), and the mill site. No notable patterns were observed at the Ajax Mine site.

- At both mine sites, arsenic was detected in both the plant tissue and the co-located soil samples at concentrations above the comparison criteria.

- Both sites include waste rock piles and contaminated soil from AMD. Erosion of fine-grained waste material was evident at both mine sites adjacent to the waste piles along Lucas Gulch. These eroded waste materials would enter the creek during periods of high rainfall and snowmelt.

- There is a potential for future overflows of the retention ponds at both sites. Such an event would allow the discharge of AMD, sediment and flocculent to enter Lucas Gulch.

Air Pathway

- The air pathway is considered complete for the Magnolia site, as arsenic was detected in 2 shallow soil samples at concentrations exceeding the USEPA soil screening level for inhalation of particulates. However, because the air pathway is directly related to the soil pathway, reducing or eliminating contaminated soils at the site would likely render the air pathway incomplete. Further assessment of the air pathway is not considered necessary, if the soil pathway is addressed.

Recommendations

Based on the information presented herein, EA recommends performance of an Engineering Evaluation/Cost Analysis (EE/CA) at both the Magnolia Mine and Ajax Mine. As part of the EE/CA, a risk assessment should be performed to assess the human and ecological impacts, establish site removal cleanup standards, and evaluate remediation technologies.

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Figures

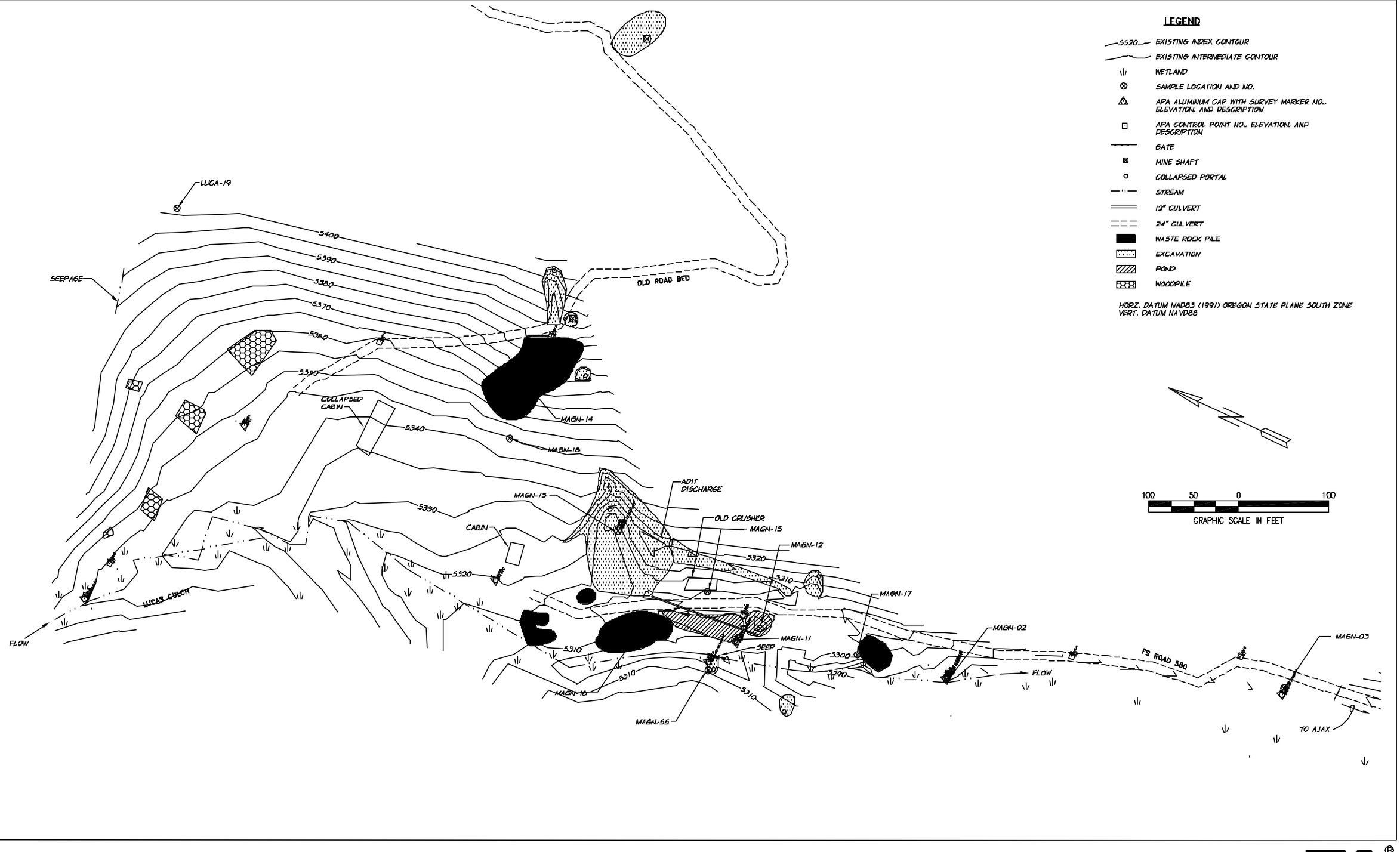


Figure 1. MAGNOLIA MINE SITE

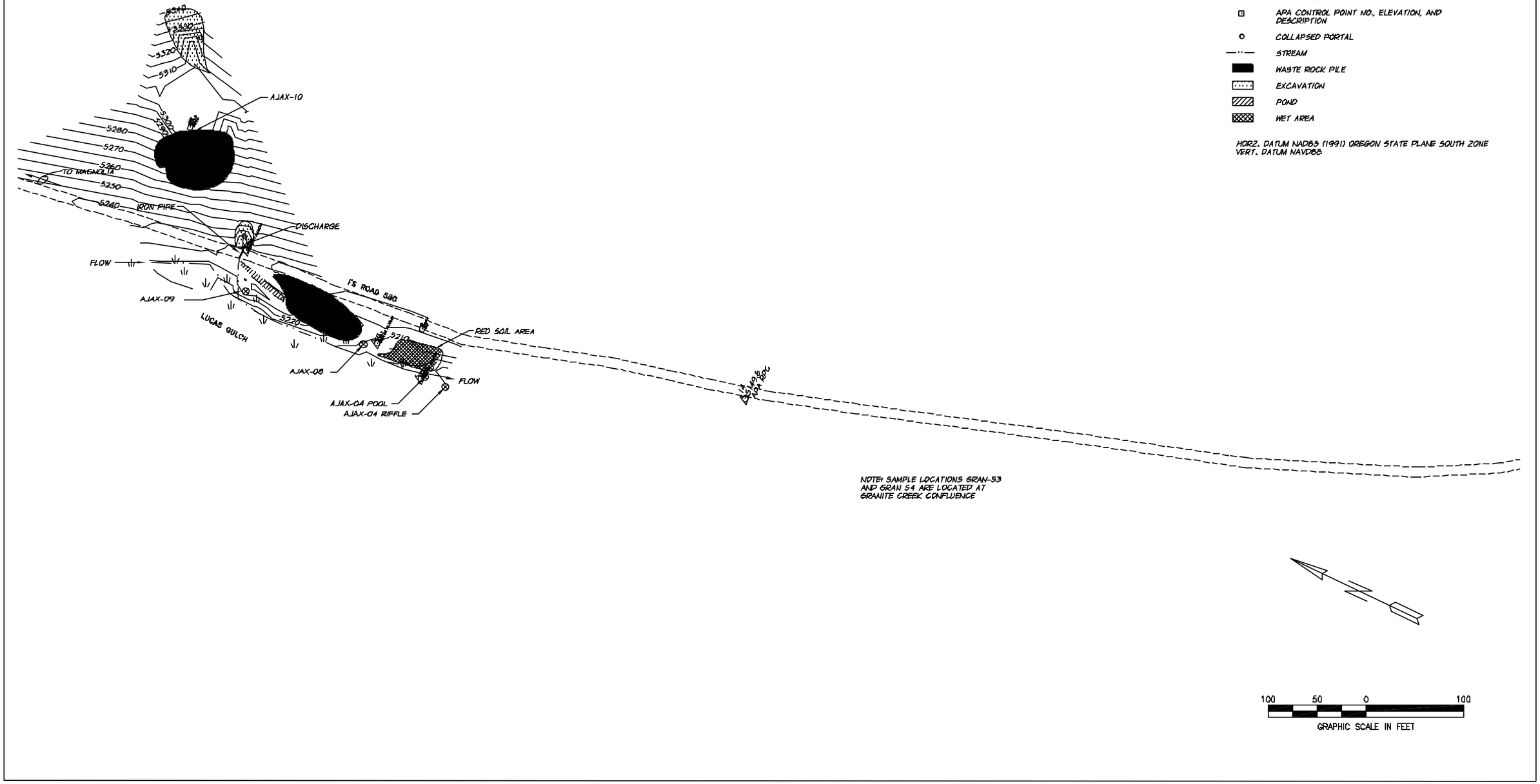


Figure 2. AJAX MINE SITE

Tables

Table 1 Ajax/Magnolia Surface Water Analytical Results

			TAL Metals, µg/L																		
		Sample No.	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SODIUM	THALLIUM	VANADIUM	ZINC
Adits	MAGN	AD-SFW-13	33.5B	<4.7U	**61.6**	**21.1B**	**132000**	<1.4U	11.1B	<2.4U	**955**	<1.3U	68700	**1690**	<0.1U	**64.7**	4800B	<1.7U	5780	**4.3B**	<2U	26.1
		AD-SFW-55	57.2B	<4.7U	<4.8U	**42.8B**	21500	<1.4U	<2U	4.6B	<16.8U	<1.3U	10600	36.1	<0.1U	<2.1U	1480B	<1.7U	6360	<2.8U	<2U	4.6B
	AJAX	AD-SFW-07	**907**	4.5B	**41.9**	**29.5B**	109000	<0.6U	13.3B	10.3B	**10500**	**4.4**	59500	**1590**	**0.48**	**41.6**	3860B	**1.8B**	5200	<2.8U	2.2B	83
Stream Samples	MAGN	ST-SFW-01	30.2B	4.1B	<2.4U	**55.2B**	28200	<0.6U	<1.8U	<1.4U	38.8B	<1.5U	12800	3.3B	**0.1B**	<2U	2420B	**2.4B**	6480	<2.8U	<2.2U	<5.7U
		ST-SFW-02	29.1B	5.6B	**29.7**	**62.3B**	40500	<0.6U	<1.8U	<1.4U	102	<1.5U	18500	21.2	<0.1U	<2U	2780B	<1.7U	6230	<2.8U	<2.2U	<5.7U
		ST-SFW-03	33.4B	<4.7U	**28.2**	**71.7B**	41900	<1.4U	<2U	<2.4U	112	<1.3U	19300	4.7B	<0.1U	<2.1U	2400B	<1.7U	6100	**3.1B**	<2U	3.3B
	AJAX	ST-SFW-04	28.2B	4.2B	**22.9**	**70.2B**	41000	<0.6U	<1.8U	2.1B	90.2B	**2B**	18800	8.6B	**0.11B**	<2U	2530B	<1.7U	6700	<2.8U	2.5B	<5.7U
		ST-SFW-52	83.1B	<3.8U	**63.6**	**26.7B**	111000	<0.6U	<1.8U	<1.4U	**1230**	<1.3U	58800	**136**	**0.16B**	<2U	4440B	<1.7U	5420	<2.8U	<2.2U	7.5B
	GRAN	ST-SFW-53	79.3B	<4.7U	**13.1**	**55B**	15300	<1.4U	<2U	<2.4U	<16.8U	<1.3U	3540B	10.3B	**0.2B**	<2.1U	1870B	<1.7U	3380B	<2.8U	<2U	3.1B
		ST-SFW-54	26.4B	<3.8U	**9.6B**	**51B**	15900	0.74B	<1.8U	<1.4U	32.3B	<1.3U	4040B	6.7B	**0.1B**	<2U	2490B	<1.7U	3650B	<2.8U	<2.2U	<5.7U
Ponds	MAGN	PD-SFW-11	29.4B	<4.7U	**7.7B**	**15.8B**	**134000**	<1.4U	5.2B	<2.4U	**484**	<1.3U	69800	**880**	**0.16B**	**43**	4750B	<1.7U	5870	<2.8U	<2U	11.9B
	AJAX	PD-SFW-06	30.6B	<3.8U	<2.4U	**9.8B**	106000	<0.6U	<1.8U	<1.4U	<16.8U	2.3B	58400	**95.9**	**0.12B**	5B	3480B	<1.7U	5240	<2.8U	<2.2U	<5.7U
Comparison	Criteria	EPA-Ecological	87	30	150	4	NA	71.8 314.7	23	13.2 61.5	1000	0.8 5.2	NA	120	0.77	56.7 260.9	NA	5	NA	12	20	113.6 523.8
		EPA-Human Health	NA	5.6	0.018	1000	NA	NA	NA	1300	300	NA	NA	50	NA	610	NA	170	NA	1.7	NA	7400
		Oak Ridge PRG	87	30	NA	4	NA	11	23	12	1000	3.2	NA	120	1.3	160	NA	0.39	NA	9	20	110
		OR-Ecological	87	1600	NA	4	116000	83.5 365.9	23	13.2 61.5	1000	1.0 10.1	82000	120	0.012	56.9 261.7	53000	5	680000	40	20	115.2 531.2
		OR-Human Health	NA	146	0.022	1000	NA	50	NA	NA	300	50	NA	50	0.144	13.4	NA	10	NA	13	NA	NA

Table 1 Ajax/Magnolia Surface Water Analytical Results, continued

			Laboratory General Chemistry										Field Parameters								
		Sample No.	ALKALINITY, BICARBONATE MG/L	CONDUCTANCE UMHOS/CM	HARDNESS MG/L	PH PH UNITS	REDOX POTENTIAL MV	SULFATE MG/L	SUSPENDED SOLIDS, TOTAL MG/L	SUSPENDED SOLIDS, VOLATILE MG/L	TOTAL ALKALINITY MG/L	TOTAL DISSOLVED SOLIDS MG/L	CHROMIUM, HEXAVALENT MG/L	CURRENT VELOCITY FT/SEC	DEPTH FT	DISSOLVED OXYGEN MG/L	PH PH UNITS	REDOX POTENTIAL MV	SPECIFIC CONDUCTANCE µS/CM³	TEMPERATURE DEG C	TURBIDITY NTU
Adits	MAGN	AD-SFW-13	230	906	680	7	193	637	28.7	<5U	230	**841**	0	0.08	2	**5.8**	7.33	-6.3	1019	7.77	92
		AD-SFW-55	111	180	112	7.3	186	16.8	90.5	7.1	111	128	0.01	0	0.42	8.14	7.98	-6.1	205	11.6	24.1
	AJAX	AD-SFW-07	166	758	512	7.9	169.5	380	69	<5U	166	**692**	0	0.35	0.04	11.62	7.94	34.5	873	8.93	584
Stream Samples	MAGN	ST-SFW-01	142	215	260	8	164	5.2	0.9	<5U	142	169	0.02	0	0.5	9.81	8.17	28.9	245	14.7	0.14
		ST-SFW-02	139	318	156	8.1	167.5	69.3	5.2	<5U	139	**252**	0.01	0	0.17	9.66	8.42	21.2	359	14.74	0.87
		ST-SFW-03	137	315	188	8	161	57.3	0.9	<5U	137	**256**	0.01	0.03	0.33	9.82	8.7	7.1	353	14.4	0.75
	AJAX	ST-SFW-04	137	307	224	8.1	152	58.6	3.1	<5U	137	**260**	0.01	0.03	0.29	9.39	8.65	28.5	355	16.01	0.87
		ST-SFW-52	176	761	524	7.5	184	320	36	9.7	176	**733**	0	NA	0.08	**3.86**	7.84	58.6	861	15.35	39.1
	GRAN	ST-SFW-53	46.9	108	80	7.6	184	14.8	7.2	<5U	46.9	100	0	0.03	0.58	10.2	7.81	78.4	122	14.96	0.58
		ST-SFW-54	51.2	112	104	7.7	181	15.3	5	<5U	51.2	116	0	0.08	0.83	10.58	8.49	-7.5	133	14.04	5
Ponds	MAGN	PD-SFW-11	226	899	680	8	167	391	0.8	<5U	226	**772**	0.01	NA	2	9.71	8.3	38.1	1019	18	1.17
	AJAX	PD-SFW-06	170	760	524	8.1	164.5	350	4.1	<5U	170	**700**	0.01	NA	0.42	11.13	8.57	83.6	880	18.91	2.72
Comparison	Criteria	EPA-Ecological			>20	6.5-9			NA			NA				8	6.5-9				
		EPA-Human Health			NA	5-9			NA			250				NA	5-9				
		Oak Ridge PRG			NA	NA			NA			NA				NA	NA				
		OR-Ecological			NA	6.5-9			NA			500				6-11	6.5-9				
		OR-Human Health			NA	NA			NA			NA				NA	NA				

Table 1 Ajax/Magnolia Surface Water Analytical Results, continued

Notes

- **Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.**
- Cyanide (total) was anaylzed for but not detected in any sample.
- All alkalinity was contributed by bicarbonate: carbonate and hydroxide were not detected in any samples.
- The following dissolved metals were analyzed for but not detected in any sample: beryllium, cadmium and silver.
- There were no comparison criteria for total chromium (Cr); therefore, the most conservative criteria, for Cr 6, were used.
- Hardness-based criteria for cadmium, chromium III, copper, lead, nickel, silver, and zinc were calculated for each sample. The range of calculated criteria is indicated, the top number indicating the lowest and the bottom number the highest.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.

Empty cells in the table indicate no data.

Units:

DEG C	= Degrees celcius	MV	= Millivolts
FT	= Feet	NTU	= Nephelometric turbidity units
FT/SEC	= Feet per second	UG/L	= Micrograms per liter
MG/L	= Milligrams per liter	UMHOS/CM	= Micro MHOS per centimeter'
µS/CM³	= Microsiemens per cubic centimeter		

Comparison Criteria

Oregon Ecological - Criteria are the lowest of:
- ODEQ Water Quality Criteria, Protection of Aquatic Life, Fresh Chronic Criteria (OAR 340-041-001), or
- ODEQ (1998b) Guidance for Ecological Risk Assessment, Level II Screening Values for surface water.

EPA Ecological - Criteria are the lowest of:
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, chronic; hardness dependent values were calculated for each sample, or
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, Tier II secondary chronic values calculated by Oak RidgeNational Laboratory (Suter & Tsao 1996).

Oak Ridge PRGs - Oak Ridge National Laboratory Preliminary Remediation Goals (Efroymson et al 1997c).

Oregon Human Health - ODEQ Water Quality Criteria, Protection of Human Health, Water and Fish Ingestion (OAR-340-041-001).

EPA Human Health - USEPA (2002) recommended ambient water quality criteria for protection of human consumption of fish; hardness dependent values were calculated for each sample, the range of values is indicated.

Table 2 Ajax/Magnolia Pore Water Analytical Results

			TAL Metals, µg/L												Field Parameters						
		Sample No.	ALUMINUM	ARSENIC	BARIUM	CALCIUM	CHROMIUM, TOTAL	IRON	MAGNESIUM	MANGANESE	MERCURY	POTASSIUM	SODIUM	THALLIUM	ZINC	CHROMIUM, HEXAVALENT MG/L	DISSOLVED OXYGEN MG/L	PH PH UNITS	REDOX POTENTIAL MV	SPECIFIC CONDUCTANCE µS/CM³	TEMPERATURE DEG C	TURBIDITY NTU
Stream Samples	MAGN	ST-PWP-01	60.7B	<2.4U	**74.4B**	29200	2.1B	40.4B	12500	4B	**0.11B**	2150B	6550	<2.8U	<5.7U	0.01	8.75	8.1	34.2	255	16.6	579
		ST-PWP-02	<23.6U	26.2	**76B**	41800	<1.4U	65.2B	19300	8.6B	**0.19B**	2380B	6400	<2.8U	9.7B	0	8.6	8.4	16.2	359	16.15	47.2
		ST-PWP-03	<23.6U	27.3	**74.2B**	41700	<1.4U	86.9B	19200	3.7B	**0.14B**	2470B	6320	<2.8U	8.5B	0	8.21	8.58	5.6	355	16.1	21
	AJAX	ST-PWP-04	28B	11.5	**84.1B**	44200	<1.4U	34.9B	20000	15.2	<0.1U	2480B	7420	<5.7U	5B	0.01	**5.81**	8.11	59.4	370	17.83	601
	GRAN	ST-PWP-53	60.5B	16.7	**47.6B**	15500	<1.4U	23.3B	3580B	4B	<0.1U	2000B	3420B	4.1B	5.9B	0.00	9.35	8.2	83.9	124	15.9	61.8
		ST-PWP-54	45.7B	13.2	**45.9B**	16700	<1.4U	<16.8U	4440B	4.4B	**0.12B**	1830B	3540B	<2.8U	5.4B	0	10.79	8.45	10.2	138	12.08	176
Comparison	Criteria	EPA-Ecological	87	150	4	NA	71.8 314.7	1000	NA	120	0.77	NA	NA	12	113.6 523.8		8	6.5-9				
		Oak Ridge PRG	87	NA	4	NA	11	1000	NA	120	1.3	NA	NA	12	110		NA	NA				
		OR-Ecological	87	NA	4	116000	83.5 365.9	1000	82000	120	0.012	53000	680000	40	115.2 531.2		6-11	6.5-9				

Table 2 Ajax/Magnolia Pore Water Analytical Results, continued

Notes

- **Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.**
- Cyanide (total) was anaylzed for but not detected in any sample.
- All alkalinity was contributed by bicarbonate; carbonate and hydroxide were not detected in any samples.
- The following dissolved metals were analyzed for but not detected in any sample: antimony, beryllium, cadmium, cobalt, copper, lead, nickel, selenium, silver, and vanadium.
- There were no comparison criteria for total chromium (Cr); therefore, the most conservative criteria, for Cr 6, were used.
- Hardness-based criteria for cadmium, chromium III, copper, lead, nickel, silver, and zinc were calculated for each sample. The range of calculated criteria is indicated, the top number indicating the lowest and the bottom number the highest.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.
Empty cells in the table indicate no data.

Units:

DEG C = Degrees celcius
MG/L = Milligrams per liter
FT/SEC = Feet per second
µS/CM³ = Microsiemens per cubic centimeter
MV = Millivolts
NTU = Nephelometric turbidity units
µG/L = Micrograms per liter

Comparison Criteria

Oregon Ecological - Criteria are the lowest of:

- ODEQ Water Quality Criteria, Protection of Aquatic Life, Fresh Chronic Criteria (OAR 340-041-001), or
- ODEQ (1998b) Guidance for Ecological Risk Assessment, Level II Screening Values for surface water.

EPA Ecological - Criteria are the lowest of:

- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, chronic; hardness dependent
- USEPA (2002) recommended ambient water quality criteria for freshwater aquatic organisms, Tier II secondary chronic

Oak Ridge PRGs - Oak Ridge National Laboratory Preliminary Remediation Goals (Efroymson et al 1997c).

Oregon Human Health - ODEQ Water Quality Criteria, Protection of Human Health, Water and Fish Ingestion (OAR-340-041-001).

EPA Human Health - USEPA (2002) recommended ambient water quality criteria for protection of human consumption of fish; hardness dependent values were calculated for each sample, the range of values is indicated.

Table 3 Ajax/Magnolia Sediment Analytical Results

			TAL Metals and Cyanide, mg/kg																						
		Sample No.	CYANIDE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Stream Samples	MAGN	ST-PSD-01	<0.64U	14900	<0.46U	1.3	502	0.44B	<0.059U	5500	14.9	9.6	14.3	20700	3.8	3910	424	0.02B	**24.3**	394B	0.48B	<0.21U	764	<0.56U	34.2	21.8
		ST-PSD-02	<0.7U	1550	2.6B	**121**	40.2	0.65	0.16B	923	**51.7**	3.1B	**36.1**	23200	4.6	1010	319	**1.4**	6.6	848	0.45B	**3.6**	74.8B	0.99B	62.2	50.3
		ST-PSD-03	<0.55U	4750	**5.1B**	**742**	188	0.42B	**0.74**	2000	11.6	59.5	**32.8**	42100	**54.1**	1060	**1920**	**1.1**	**131**	1300	1.6	**1.2**	65.3B	0.84B	29.4	**140**
	AJAX	ST-PSD-04	<0.48U	10300	**3.4B**	**326**	233	0.71	**1.2**	7350	19.5	18.1	**80.4**	36500	**69.4**	5360	**2570**	**0.51**	**43.8**	2560	1.3	**2.2**	287B	<0.65U	39.4	**180**
		ST-RSD-04	<0.59U	9950	1.5B	**631**	263	0.76	0.58	13800	18.5	18	**36.9**	44500	26.3	8630	**2600**	**0.42**	**29.6**	2830	0.85	**1.3**	132B	<0.62U	50	120
		ST-SSD-52	<4U	16800	**12.2B**	**2800**	268	0.96B	**5.3**	16500	21	28.3B	**105**	134000	**42.5**	5490	**3480**	**1**	**161**	3250B	6.9	**2.6B**	599B	<4U	57.3	**705**
	GRAN	ST-PSD-53	<0.57U	10200	2B	**130**	139	0.24B	**0.96**	2180	10.4	6.9	18.1	21600	**38.2**	4790	364	0.11	6.2	2840	0.44B	**1.8**	<45.2U	0.69B	52.1	**150**
		ST-PSD-54	<0.59U	8910	**5.1B**	**303**	144	0.26B	**2.8**	2740	10.9	6.5	**28**	18900	**148**	3460	611	**0.32**	7.6	2400	0.8	**7.9**	70.2B	<0.67U	43	**186**
		ST-RSD-53	<0.6U	9670	2.3B	**126**	127	0.25B	**1.2**	2230	9.9	6.2	18.6	19000	**44.3**	4030	360	0.12	6.5	2550	0.42B	**4.9**	<45.9U	0.73B	45.9	**148**
		ST-RSD-54	<0.57U	7770	**5.1B**	**246**	126	0.21B	**1.8**	1750	8.3	6.4	**30**	18300	**121**	3380	560	0.12	7.3	2340	0.63	**6.3**	79.5B	0.76B	38.3	**151**
Ponds	MAGN	PD-SSD-11	<3.3U	46500	**6.5B**	**2190**	200	3.8	**3.6**	11000	**54.9**	54.9	**461**	136000	23.2	7110	**2750**	**1.2**	**159**	5430	2.6B	**2.3B**	<263U	5.5B	90.2	**515**
	AJAX	PD-SSD-06	2.9	5190	**5.2B**	**1020**	309	1.5	**9.3**	33300	4.4	254	**316**	319000	27.9	3530	**40600**	**0.76**	**860**	892B	11.6	<0.6U	<129U	<15.6U	17.8	**1660**
Comparison	Criteria	ER-L		NA	NA	8.2	NA	NA	1.2	NA	81	NA	34	NA	47	NA	NA	0.15	21	NA	NA	1	NA	NA	NA	150
		ER-M		NA	NA	70	NA	NA	9.6	NA	370	NA	270	NA	218	NA	NA	0.71	51.6	NA	NA	3.7	NA	NA	NA	410
		OR		NA	3	NA	NA	NA	0.6	NA	37	NA	36	NA	35	NA	1100	0.2	18	NA	NA	4.5	NA	NA	NA	123
		PEL		NA	NA	41.6	NA	NA	4.21	NA	160	NA	108	NA	112	NA	NA	0.696	42.8	NA	NA	1.77	NA	NA	NA	271
		TEL		NA	NA	7.24	NA	NA	0.676	NA	52.3	NA	18.7	NA	30.2	NA	NA	0.13	15.9	NA	NA	0.733	NA	NA	NA	124

Table 3 Ajax/Magnolia Sediment Analytical Results, continued

		Sample No.	Lab	Grain Size, percent						Clay Minerals. percent								
			TOC LLOYD KHAN MG/KG	GRAVEL %	SAND, COARSE %	SAND, FINE %	SAND, MEDIUM %	SILT %	CLAY %	<4µ WEIGHT% %	AMPHIBOLE %	CHLORITE %	GOETHITE %	ILLITE & MICA %	KAOLINITE %	PLAGIOCLASE %	QUARTZ %	SMECTITE %
Stream Samples	MAGN	ST-PSD-01	5130	36.6	27	6.8	23.9	3.4	2.3	2.92	9.59	0	0	4.53	0	29.73	0	56.16
		ST-PSD-02	12400	37.8	22.2	7	27.1	2.9	3	2.93	3.9	0.5	0	21.65	24.37	4.37	9.06	36.17
		ST-PSD-03	6040	54.8	24.3	3.8	12.4	2	2.6	1.96	8.84	0.63	0	23.98	16.21	2.89	8.25	39.2
	AJAX	ST-PSD-04	3840	33.1	21.4	11.3	22.4	9.4	2.4	2.37	5.86	0	0	15.43	15.04	11.14	35.82	16.71
		ST-RSD-04	15500	24.4	24.7	7.3	28.6	13.4	1.6									
		ST-SSD-52	119900	19.3	12.8	12.8	7.6	29.8	17.6	3.22	5.88	0	0	35.46	14.36	8.12	32.38	3.8
	GRAN	ST-PSD-53	2670	8.8	12.2	28.3	42.1	5.1	3.5									
		ST-PSD-54	27700	1.1	6.9	45.7	37.5	4.3	4.6									
		ST-RSD-53	6750	14.7	8.7	36.2	34.2	3.8	2.2									
		ST-RSD-54	<121U	7.4	11.8	28.1	48.3	2	2.4									
Ponds	MAGN	PD-SSD-11	11200	0	0	3.9	3.1	50.8	42.1	13.21	4.54	0.53	0	35.58	29.78	2.7	5.81	21.06
	AJAX	PD-SSD-06	17200	0	0.1	11.8	2.4	42.4	43.3	28.33	0	13.06	20.01	51.29	0	0	0	15.64

Table 3 Ajax/Magnolia Sediment Analytical Results, continued

Notes

Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.
Empty cells in the table indicate no data.

Units:

MG/KG = Milligrams per kilogram

Comparison Criteria

- Threshold Effects Level (TEL) and Probable Effects Level (PEL) from USEPA National Sediment Quality Survey, Screening Values for Chemicals Evaluated, http://www.epa.gov/waterscience/cs/vol1/appdx_d.pdf.
- Effects Range-Low (ER-L) and Effects Range-Medium (ER-M), National Oceanic and Atmospheric Administration (NOAA), from USEPA (1997) National Sediment Quality Survey, Screening Values for Chemicals Evaluated.
- ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values for freshwater sediment (there was no criterion for total arsenic; therefore, the most conservative criterion, for arsenic 3, was used).

Oak Ridge National Laboratory values are not included; they are compiled from TEL and ER-L values, and USEPA Assessment and Remediation of Contaminated Sediment (ARCS) program values which exceed TELs.

Sediment samples analyzed for clay minerology were collected in pool habitat only.

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results

			TAL Metals, mg/kg																							
		Sample No.	CYANIDE	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, HEXAVALENT	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Background	GRAN	BG-SSS-34(0.5)	<0.63U	**26400**	<0.38U	**3.4**	**187**	**0.72**	0.35B	1130		**5.7**	5.5	8.9	10800	3.8	880	**429**	**0.032B**	5.2	848	**0.61**	0.28B	1220	<0.28U	**24.9**	**50.2**
		BG-SSS-35(0.5)	<0.68U	**31200**	<0.4U	**5.5**	**268**	**1**	0.54	2110		**6.2**	6.7	15.4	12400	5.9	1560	**156**	**0.035B**	5.6	1140	**0.42B**	0.62B	1450	<0.29U	**26.5**	**43.2**
		BG-SSS-36(0.5)	<0.55U	**19400**	<0.33U	**11.4**	**319**	**0.55**	<0.026U	2080		**27.4**	10.2	11	17700	6.3	4930	**610**	**0.027B**	23.4	3920	**0.24B**	0.48B	1180	<0.24U	**47.2**	**61.3**
	LUCA	BG-SSS-19(0.5)	<0.54U	**24400**	0.84B	**4.5**	**288**	**1.2**	0.43B	1830	<2.2U	**31.3**	11.3	30.7	24600	8.4	2630	**837**	**0.14**	23.4	1570	**0.76**	0.26B	806	0.97	**47.8**	**105**
On Site	MAGN	PD-SSS-12(0.3)	4.9	**14000**	**17.1**	**3730**	**273**	**3.4**	**16.9**	19200	<5.7U	**22**	**301**	**310**	**139000**	**151**	4540	**34300**	**9**	**888**	3180	**11.6**	**12.1**	<54.2U	**36.3**	**34.2**	**1620**
		TA-SSS-15(0.5)	<0.53U	**3300**	**17.6**	**828**	72.5	**0.18B**	0.56	821	<2.2U	**5**	3.6B	35.4	24700	**524**	1060	**130**	**9.4**	6.7	2280	**3.7**	**37.2**	152B	**1.9**	**30.5**	**73**
		TA-SUS-18(1.5)	<0.49U	**23200**	0.97B	**32.6**	**328**	**1.1**	<0.025U	1040	0.49B	**24.4**	14.1	40.2	26800	9.8	4570	**614**	**0.12**	18.8	5260	**0.67**	0.48B	869	0.96	**72.8**	**91.4**
		WP-SSS-16(0.5)	<0.53U	**6740**	**5.7**	**317**	70	**0.42B**	<0.028U	2330	<2.2U	**11.2**	5.8	**50.2**	30500	**17**	1140	**193**	**0.88**	13	2610	**1.6**	**2.2**	173B	**1.2**	**43.3**	**56.2**
		WP-SUS-14(3.0)	<0.55U	**7290**	**10.6**	**1220**	**131**	**1.2**	<0.027U	11900	<2.2U	**10.8**	18	**61.2**	75700	**31.7**	3400	**2350**	**1.8**	17.1	2750	**2.4**	**4**	168B	**4.9**	**36.1**	**181**
		WP-SUS-17(2.0)	<0.52U	**1940**	**5.7**	**286**	74	**0.49**	0.57	7580	<2.0U	**14.3**	12	**90.5**	30100	**18.9**	3380	**631**	**3.2**	**32.9**	1340	**3.1**	1.8	<20.4U	**2.3**	**27.6**	**138**
	AJAX	WP-SUS-08(1.2)	<0.42U	**3870**	**6.2**	**411**	25.5	**0.59**	<0.03U	5800	<2.2U	**14.3**	14.6	**58.7**	37500	8.4	3600	**1700**	**1.2**	27.4	1430	**1.6**	0.77B	39.6B	**2.6**	**19.4**	**71**
		WP-SUS-09(1.0)	<0.5U	**2660**	3.3B	**154**	38.7	**0.46**	<0.025U	25100	<2.1U	**8**	7.8	**67.9**	23400	5	9600	**2130**	**1.9**	22.7	1990	**0.96**	0.32B	145B	**2.4**	**15.1**	**47.3**
		WP-SUS-10(2.0)	<0.52U	**18800**	1.6B	**95.7**	**186**	**0.89**	<0.025U	985	0.52B	**39.5**	16.8	**84.7**	35500	9.7	4260	**762**	**0.43**	26.8	3730	**1.1**	1.4	714	**1.5**	**65.8**	**87.4**
Comparison	Criteria	EPA Industrial PRG	35	100000	410	1.6	67000	1900	450	NA	64	450	1900	41000	100000	750	NA	19000	310	20000	NA	5100	5100	NA	67	7200	100000
		EPA-Ecological	NA	NA	21	37	NA	NA	29	NA	330	5	32	61	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	120
		EPA-Human Health	1600	NA	31	0.4	5500	0.1	78	NA	270	270	NA	NA	NA	400	NA	NA	NA	1600	NA	390	390	NA	NA	550	23000
		Oak Ridge	NA	NA	5	9.9	283	10	4	NA	NA	0.4	20	60	NA	40.5	NA	NA	0.00051	30	NA	0.21	2	NA	1	2	8.5
		OR-Ecological	NA	50	5	8	85	10	4	NA	410	NA	20	50	NA	16	NA	100	0.1	30	NA	1	2	NA	1	2	50

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

			TAL Metals by SPLP, µg/L																				
		Sample No.	ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SELENIUM	SILVER	SODIUM	THALLIUM	VANADIUM	ZINC
Background	GRAN	BG-SSS-34(0.5)	1010	4.1B	<2.4U	11.5B	<0.2U	<0.3U	777B	0.99B	<1.8U	4.7B	405	3B	<293U	19.9	20	<2U	651B	3B	<0.9U	17400	<2.8U	<2.2U	13.2B
		BG-SSS-35(0.5)	1380	<3.8U	<2.4U	13.3B	<0.2U	<0.3U	1200B	1.1B	<1.8U	5B	362	<1.5U	<293U	6.8B	14.4B	<2U	475B	2.3B	<0.9U	15500	<2.8U	<2.2U	7.8B
		BG-SSS-36(0.5)	10100	3.9B	6.5B	165B	<0.2U	<0.3U	2040B	4.9B	2.4B	8.5B	5070	3.3	930B	211	21	5B	1770B	3.7B	<0.9U	18900	<2.8U	10.2B	25.2
	LUCA	BG-SSS-19(0.5)	534	<3.8U	<2.4U	9.9B	<0.2U	0.33B	1440B	1.1B	<1.8U	3.9B	266	1.7B	347B	31.4	<10U	<2U	711B	2B	<0.9U	5140	<2.8U	<2.2U	<5.7U
On Site	MAGN	TA-SSS-15(0.5)	54.5B	7.5B	18.1	10B	<0.2U	<0.3U	1950B	<0.6U	<1.8U	6.9B	392	17.9	802B	4B	<10U	<2U	743B	2.7B	<0.9U	6950	<2.8U	<2.2U	12B
		WP-SSS-16(0.5)	1840	<3.8U	6.1B	54.2B	0.36B	1.4B	60900	5.2B	19.5B	97.7	3880	72.6	1940B	1050	<10U	17.1B	1120B	<1.7U	<0.9U	3630B	<2.8U	<2.2U	122
		WP-SUS-14(3.0)	<18.3U	5.3B	<2.4U	29.9B	<0.2U	2.5B	359000	<0.6U	3B	3.2B	<66.7U	<1.5U	31200	5740	<10U	29.8B	3030B	4.7B	<0.9U	6330	4.7B	<2.2U	<5.7U
		WP-SUS-17(2.0)	<18.3U	<3.8U	<2.4U	11B	<0.2U	<0.3U	13800	0.89B	<1.8U	2.9B	<66.7U	<1.5U	2710B	1.3B	12.4B	<2U	933B	2.6B	<0.9U	5280	<2.8U	<2.2U	<5.7U
	AJAX	WP-SUS-08(1.2)	46.4B	4.3B	5.9B	11.5B	<0.2U	0.38B	12100	1.1B	<1.8U	3B	<66.7U	2.1B	3800B	<0.7U	<10U	<2U	1420B	2.2B	<0.9U	1220B	<2.8U	<2.2U	6.8B
		WP-SUS-09(1.0)	<18.3U	4B	<2.4U	7.9B	<0.2U	<0.3U	10900	0.99B	<1.8U	3B	<66.7U	<1.5U	2960B	<0.7U	<10U	<2U	706B	<1.7U	<0.9U	12000	<2.8U	<2.2U	<5.7U
		WP-SUS-10(2.0)	284	<3.8U	<2.4U	107B	0.23B	0.94B	1980B	<0.6U	<1.8U	25.3	<66.7U	<1.5U	924B	495	<10U	11.2B	3190B	<1.7U	<0.9U	5600	<2.8U	<2.2U	45.2

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

			Lab	Acid/Base Accounting							
		Sample No.	PH PH UNITS	FIZZ RATING NO UNITS	MAXIMUM POTENTIAL ACIDITY KG CACO3/TON	NEUTRALIZATION POTENTIAL KG CACO3/TON	PASTE PH PH UNITS	SULFATE SULFUR WT.%	SULFIDE SULFUR WT.%	TOTAL SULFUR WT.%	NET NEUTRALIZATION POTENTIAL KG CACO3/TON
Background	GRAN	BG-SSS-34(0.5)	6.4	none	<0.6	-5.0	6.0	<0.01	< .02	< .02	-5.0
		BG-SSS-35(0.5)	6.7	none	<0.6	-5.0	6.4	<0.01	< .02	< .02	-5.0
		BG-SSS-36(0.5)	6.6	none	<0.6	0.5	6.3	<0.01	< .02	< .02	0.5
	LUCA	BG-SSS-19(0.5)	5.9	none	<0.6	-6.0	5.7	<0.01	< .02	< .02	-6.0
On Site	MAGN	PD-SSS-12(0.3)	7.7								
		TA-SSS-15(0.5)	4.5	none	10.3	-2.3	4.8	0.20	0.33	0.53	-12.6
		TA-SUS-18(1.5)	7.2								
		WP-SSS-16(0.5)	2.7	none	1.6	-5.3	3.1	0.27	0.05	0.32	-6.9
		WP-SUS-14(3.0)	5.7	slight	30.3	12.5	5.7	0.61	0.97	1.58	-17.8
		WP-SUS-17(2.0)	7.7	slight	23.4	31.0	7.7	0.02	0.75	0.77	7.6
	AJAX	WP-SUS-08(1.2)	7.8	slight	22.8	72.5	7.8	0.01	0.73	0.74	49.7
		WP-SUS-09(1.0)	8.2	slight	17.8	83.8	8.2	<0.01	0.57	0.57	66.0
		WP-SUS-10(2.0)	3.9	none	0.9	-1.3	4.1	0.06	0.03	0.09	-2.2

Table 4 Ajax/Magnolia Surface and Subsurface Soil Analytical Results, continued

Notes

Bold, shaded results indicate concentrations above the lowest applicable comparison criterion.

Cyanide (total) was anaylzed for but not detected in any sample.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).
NA = Not available.

Units:

MG/KG = Milligrams per kilogram
UG/KG = Micrograms per kilogram
UG/L = Micrograms per liter

Comparison Criteria

- OR Ecological - ODEQ (1998) Guidance for Ecological Risk Assessment, Level II Screening Values - lowest criteria for bird, plant, invertebrate, and mammal.
- EPA Ecological - EPA (2000b) Ecological Soil Screening Levels - Lowest Criteria Indicators for bird, plant, invertebrate, and mammal.
- Oak Ridge National Laboratory, US DOE (Efroymson et al 1997), Preliminary Remediation Goals (PRGs) for protection of plants, wildlife, or soil invertebrates.
- EPA Human Health Criteria - Generic Soil Screening Levels (SSLs) for Protection of Human Health EPA (2000a).
- EPA Region 9 PRGS for industrial soil (http://www.epa.gov/region09/waste/sfund/prg/index.htm).

Table 5 Ajax/Magnolia Plant Tissue Analytical Results

		Sample No.	TAL Metals, mg/kg																	
			ALUMINUM	ANTIMONY	ARSENIC	BARIUM	BERYLLIUM	CADMIUM	CALCIUM	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	POTASSIUM	SELENIUM	SODIUM	VANADIUM	ZINC
Background	GRAN	BG-PLT-34	143	<1.2U	<1.2U	341	0.071B	0.37B	13300	<0.51U	4.3B	181	1.1	4280	262	<0.045U	16800	<0.86U	311B	<0.51U	18.1
		BG-PLT-35	312	<1.3U	<1.3U	368	0.12B	<0.16U	10400	<0.53U	4.6B	315	0.91	4290	202	<0.052U	19600	1.2B	340B	0.94B	14.2
		BG-PLT-36	213	<1U	<1.1U	505	0.054B	<0.13U	17300	<0.44U	4.8B	247	0.38B	4570	324	<0.045U	16200	0.95B	285B	0.6B	13.4
	LUCA	BG-PLT-19	72.7	<1.2U	<1.3U	252	0.12B	<0.16U	12400	<0.52U	5.7B	132	1.1	4330	238	<0.051U	16500	1.4	330B	<0.52U	21.4
On Site	MAGN	PD-PLT-11	290	<1.4U	8.1	86.7	0.12B	<0.18U	14000	<0.62U	5.8B	679	1.7	5200	95.3	0.064B	16200	<1U	342B	1.3B	27
		WP-PLT-14	157	<1.3U	3	123	0.12B	<0.17U	15200	<0.55U	6.8B	338	0.91	6130	113	<0.047U	14600	1.6	292B	0.65B	22.3
		WP-PLT-17	409	1.3B	2.9	277	0.13B	0.3B	15000	<0.56U	6.1B	692	1.1	6250	212	<0.047U	14000	1.4	317B	1.6B	20.9
	AJAX	PD-PLT-06	161	<1.4U	4.1	34.2B	0.088B	<0.18U	14800	0.61B	5.6B	718	1.7	6560	208	0.058B	16200	<1U	595B	1.1B	20.6
		WP-PLT-08	218	<1.4U	20.4	37.5B	0.098B	<0.17U	16000	<0.58U	6.5B	1080	1.2	7170	154	<0.048U	17300	1.6	422B	1.2B	19.5

Notes

Cyanide (total) was anaylzed for but not detected in any sample.
The following metals were analyzed for but not detected in any sample: chromium, nickel, silver, and thallium.

U = Analyte was analyzed for but not detected.
B = Analyte was detected at a concentration between the method detection limit (MDL) and practical quantitation limit (PQL).

Units:
MG/KG = Milligrams per kilogram

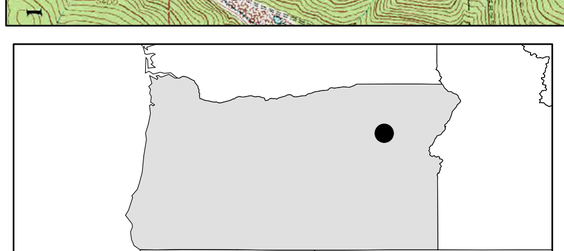
Plates

1-MILE RADIUS

MAGNOLIA MINE SITE

AJAX MINE SITE

4-MILE RADIUS



0 1/2 1 2 3 4 MILES

Source: Oregon Geospatial Data Clearinghouse - USGS Topo maps

N

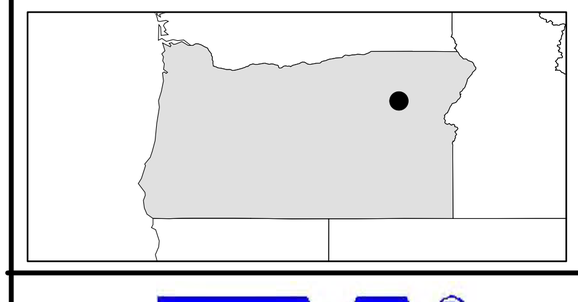
EA®	AJAX/MAGNOLIA MINE SITE INSPECTION UMATILLA NATIONAL FOREST, OREGON	PLATE 1 SITE LOCATION WITH 1 AND 4-MILE RADII.

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
GH	DC	DC	JK	AS SHOWN	10 NOV 2003	1389016	I:\NFS\SITELOCATION-AJAX_MAG.MXD

15-MILES DOWNSTREAM

MAGNOLIA MINE SITE

AJAX MINE SITE



0 1/2 1 2 3 4 MILES

Source: Oregon Geospatial Data Clearinghouse - USGS Topo maps

EA®	AJAX/MAGNOLIA MINE SITE INSPECTION UMATILLA NATIONAL FOREST, OREGON	PLATE 2 SITE LOCATION AND 15-MILE DOWNSTREAM REACH.

PROJECT MGR:	DESIGNED BY:	CREATED BY:	CHECKED BY:	SCALE:	DATE:	PROJECT NO:	FILE NO:
GH	DC	DC	JK	AS SHOWN	10 NOV 2003	1389016	I:\NFS\AJAX_MAG 15-MILE.MXD

Appendix A

Deviations from the Project Plans

DEVIATIONS FROM THE PROJECT PLANS, AJAX AND MAGNOLIA MINE SITES SI

Ajax Mine				
Surface Water - Stream	2 pool	ref, site	1	Downstream station deemed redundant with the added GRAN-54 station. As such AJAX-05 was eliminated.
Surface Water - Settling po	1	from pond	1	As per Work Plan
Surface Water - Adit portal	1	if water is discharging	1	As per Work Plan
Surface Water - drainage from settling pond	0		1	Water was observed draining from base of settling pond into Lucas Gulch. Referred to as AJAX-52.
Pore Water	4 (2 riffle/2 pool)	ref, site	1	Downstream station deemed redundant with the added GRAN-54 station. As such AJAX-05 was eliminated. Due to the time required to collect the sample volume, the scope was reduced to collecting pore water in pool habitat only.
Pore Water- Settling pond	1	from pond	0	Not sampled due to pond being uninhabitated by fish.
Soil- Adit discharge (or sedi	1	sediment if water is present	0	Collected sediment from pond immediately below the adit discharge, therefore, sample would be redundant.
Sediment - Stream	4 (2 riffle/2 pool)	ref, site	2	Downstream station deemed redundant with the added GRAN-54 station. As such, AJAX-05 was eliminated.
Sediment/Soil - Settling Por	1	from pond	1	Sample was sediment since water was present (Station AJAX-06)
Benthic	4	2 samples per location	1	Downstream station deemed redundant with added GRAN-54 station. As such AJAX-05 was eliminated. Sampled only riffles since adequate pool habitat was lacking.
Waste pile No. 1	2	surface, subsurface	2	Native soil interface beneath waste pile was not accessible using hand auger; however two subsurface samples were collected to determine heterogeneity within WP material; one subsurface sample collected in run-off channel - probable route of overland runoff into stream
Waste pile No. 2	2	surface, subsurface	1	Native soil interface beneath waste pile was not accessible using hand auger; only subsurface sample collected; the similarity of surface and subsurface WP material, and the WP's remoteness from surface water bodies did not warrant the collection of an additional sample
Downhill from WP	1	subsurface	0	No sample collected; stream was immediately adjacent to WP
Plant Tissue	2	Co-located with settling pond and WP	2	As per Work Plan

Magnolia Mine				
Surface Water - Stream	3 pool	ref, site, between Mag. and Ajax mine	3	As per Work Plan
Surface Water - Upper settl	1	from pond	1	As per Work Plan (Station MAGN-11)
Surface Water - Lower settl	1	from pond	0	Not sampled due to pond being dry.
Surface Water - Main adit p	1	if water is discharging	1	As per Work Plan (Station MAGN-13)
Surface Water - Secondary	0	W. bank of Lucas Gulch	1	Water observed draining from adit and flowing into Lucas Gulch. (Station MAGN-55).
Pore Water	6 (3 riffle/3 pool)	ref, site, between Mag. and Ajax mine	3	Due to the time required to collect the sample volume, the scope was reduced to collecting pore water in pool habitat at the three stations.
Pore Water- Upper settling	1	from pond	0	Not sampled due to pond being uninhabited by fish.
Pore Water- Lower settling	1	from pond	0	Not sampled due to pond being dry.
Sediment - Stream	6 (3 riffle/3 pool)	ref, site, between Mag. and Ajax mine	3	
Sediment/Soil - Upper Settl	1	from pond	1	Sample was sediment since water was present (Station MAGN-11)
Sediment/Soil - Lower Settl	1	from pond	1	Sample was soil since pond was dry (Station MAGN-12)
Soil- Adit discharge (or sedi	1	surface soil (sediment if water is present)	0	Sample was not collected, since a sample was collected from the pond which the adit discharges into.
Benthic	6	2 samples at each (ref, site, between Mag and Ajax)	3	Sampled only riffles since adequate pool habitat was not identified.
Top of upper waste pile	1	surface	1	Subsurface sample was collected
Toe of upper waste pile	2	surface, subsurface	0	Downhill sample was collected immediately below upper waste pile; toe of upper waste pile samples would not have contributed that much more data
Top/sidewall of lower waste	2	surface, subsurface	2	Native soil interface beneath waste pile was not accessible using hand auger; however two subsurface samples were collected to determine heterogeneity within WP material; one subsurface sample collected in run-off channel - probable route of overland runoff into stream
Toe of lower waste pile	2	surface, subsurface	0	No sample collected; stream was immediately adjacent to WP
Downhill from WP	1	subsurface	1	Collected downhill of upper WP
Old crusher	0	surface	1	Possible old crusher discovered by lower adit WP; Soils adjacent to crusher potential "hot spot"; sampled soil to determine if "hot spot" or not
Plant Tissue	4	Co-located with the upper and lower settling ponds and upper and lower WPs	3	No plants were located at the lower pond.

Appendix B

Site Photographs

MAGNOLIA MINE PHOTOGRAPHS



Photo 1 Date: 7/18/03 Top of upper waste pile sample location MAGN-14 at Magnolia Mine.
Time: 1340



Photo 2 Date: 7/18/03 Sample location at lower waste pile – middle at Magnolia Mine (MAGN-16).
Time: 1425



Photo 3 Date: 7/18/03 Time: 1500 Closeup of sample MAGN-15 with stream in background.



Photo 4 Date: 7/18/03 Time: NA Sample location at lower waste pile – southern end above Lucas Gulch (MAGN-17) at Magnolia Mine.



Photo 5 Date: 7/18/03 Adit drainage path at Magnolia.
Time: NA



Photo 6 Date: 7/18/03 View of two ponds (Magnolia Mine).
Time: NA



Photo 7 Date: 7/18/03 View of recent excavation (Magnolia Mine).
Time: NA



Photo 8 Date: 7/18/03 View of recently excavated sediment from upper settling pond (Magnolia Mine).
Time: NA



Photo 9 Date: 7/18/03 Time: NA View of adit on Lucas Gulch west of settling ponds, drainage into creek (Magnolia Mine).



Photo 10 Date: 7/18/03 Time: NA View of primary adit showing drainage into ponds (Magnolia Mine).



Photo 11 Date: 7/18/03 Time: NA View of *Equisetum* (a few sedges on the side) showing red iron oxide (Magnolia Mine).



Photo 12 Date: 7/18/03 Time: NA Structure at Magnolia Mine.



Photo 13 Date: 7/18/03 Time: NA Pool at MAGN-02 with small redband trout or westslope cutthroat trout (Magnolia Mine).

AJAX MINE PHOTOGRAPHS



Photo 14 Date: 7/17/03 View of waste pile site (Ajax Mine).
Time: NA



Photo 15 Date: 7/17/03 View of settling pond (Ajax Mine).
Time: NA



Photo 16 Date: 7/18/03 Time: 1248 Waste pile sample location (AJAX-10) at Ajax Mine.



Photo 17 Date: 7/18/03 Time: 1250 Adit above waste pile at Ajax Mine.



Photo 18 Date: 7/17/03 Time: 1030 View from adit at road showing waste pile and stream located immediately behind wastepile (Ajax Mine).



Photo 19 Date: 7/17/03 Time: 1030 View of settling pond - shows muddy nature of sediment (Ajax Mine).



Photo 20 Date: 7/17/03 South of settling pond showing seep that enters stream (Ajax Mine).
Time: 1030



Photo 21 Date: 7/17/03 Closeup of seep (Ajax Mine).
Time: 1030



Photo 22 Date: 7/17/03 Closer view of Lucas Gulch (Ajax Mine).
Time: 1030



Photo 23 Date: 7/17/03 View of seep and sample location (Ajax Mine).
Time: NA



Photo 24 Date: 7/17/03 Riffle looking upstream (AJAX-04).
Time: NA

GRANITE CREEK PHOTOGRAPHS (NEAR LUCAS GULCH CONFLUENCE)



Photo 25 Date: 7/17/03 View of open nature of Granite Creek above Lucas Gulch entrance
Time: NA



Photo 26 Date: 7/17/03 View upstream of pool site (GRAN-53).
Time: NA

Appendix C

General Information Forms

GENERAL INFORMATION FORM

GENERAL

Region/Station: 06 Forest Number: _____ District No.: _____
Congressional District: 02

Project Name: Ajax/Magnolia Mines
Project Type: Site Inspection
Regional Priority: NA
5th Level HUC: NA 4th = 17070202 N.F. John Day
Single Site: ____ Multiple Site: x
List all site names in multiple sites: Ajax and Magnolia Mines

ENVIRONMENT

Watershed Name: North Fork John Day
Regional Watershed Priority: 02
Watershed size: ~1830 mi.^{2}
Size of disturbed area (acres): ~5
Nearest surface water source: Lucas Gulch
Miles of stream impacted by site: ~1/4 mile
303d listed impaired surface water Yes ____ No x
If 303d listed impaired, what are the water quality limited contaminants? _____

Is the site affecting a Wild and Scenic river Yes ____ No x
Describe potential for a catastrophic failure if not addressed: Low

Beneficial uses downstream: Recreation, salmonid habitat and passage
Nearest critical sensitive area: Wetlands, anadromous fish migration route
Distance sensitive area is from site: ~1/4 mile
Sensitive species: redband trout, westslope cutthroat trout
T&E species:
Is the soil environment conducive to contaminant movement Yes x No ____
Activities in the watershed that also contribute to environmental damage (logging, roads, dredging, grazing, etc.): Roads, mining, limited logging

Would a removal action have a noticeable positive impact on or reduce the potential future risk of damaged resources Yes x No ____
Other critical information relating to the environment: _____

HUMAN HEALTH AND SAFETY

	Within 200 ft of the Site	Within 4 mi of the Site	Within 15 mi of the Site
Year round population based on residences	0	~50	NA
Seasonal population based on residences	0	~50	NA
Water wells	0	1	NA
Surface water intakes	0	0	0

Recreational activities within 200 ft of the site: None

Recreational activities that occur within 15 mi of the site: Hiking, camping, fishing, hunting

Established recreational sites within 200 ft of the site: None

Established recreational sites within 15 mi of the site: Campgrounds, trails

Depth to groundwater (ft): NA

Beneficial uses downstream: Habitat, recreation

Physical hazards: Settling ponds, debris, steep slopes, open mine shafts on hillsides

Hazard	
Dangerous Highwall	No
Subsidence	No
Vertical Opening/Shaft	Yes
Dangerous Impoundment	No
Dangerous Pile and Embankment	No
Dangerous Slide	No
Hazardous Equipment or Unstable Structures	No
Hazardous Explosive Gases	No
Hazardous Water Body/Ponds	Yes
Solid Waste	No
Horizontal Opening/Adit	Yes

Other critical information relating to health and safety:

MIXED OWNERSHIP INFORMATION

% of the site on NFS land (managed by NFS): 100

% of the watershed on NFS land (managed by NFS): ~85

POTENTIAL CONTAMINATION

	Yes	No
Surface Water Indicators		
High turbidity in surface water		X
Active erosion into surface water	X	
Staining or precipitate/sediments	X	
Aquatic kills		X
Visible plume		X
Discharges to surface water sources (i.e., adit drainage or leachate)	X	
Noticeable decline in aquatic population (compared to upstream of the site)		X
Surface water void of life in the area of the mine site		X
Site located in the floodplain/wetland	X	
Failing or Inadequate Design		
Oversteepened slopes	X	
Unlined ponds	X	
Inadequate landfill design or dumps		X
Unstable retainment structure		X
Past Practices		
Uncontrolled landfill/dump		X
Improper disposal	X	
Chemical/wastes were stored onsite in drums/tanks, etc.	X	
Past practices at site used hazardous materials	X	
Other Indicators		
Stressed vegetation	X	
Dead vegetation or lack of vegetation	X	
Animal kills		X
Visual contaminants	X	
Heavily stained soils/salts present	X	

Other critical potential contaminant information: _____

_____

_____

ANALYTICAL/DOCUMENTED CONTAMINATION

Media	Distance	Location	Rate of Discharge/Volume (gpm or cy.)	Contaminant	Exceedance	Background
Water	On site	Magnolia East Adit	0.08 ft./sec.	Ba	Various	Various
		Magnolia West Adit	0 ft./sec.	As, Ba, Ca, Fe, Mn, Ni, Tl, TDS, DO	Various	Various
		Magnolia Pond	NA	As, Ba, Ca, Fe, Mn, Hg, Ni, TDS	Various	Various
		Lucas Gulch at Magnolia	0.03 ft./sec.	As, Ba, Hg, Se, Tl, TDS	Various	Various
	On Site	Ajax Adit	0.35 ft./sec.	Al, As, Ba, Fe, Pb, Mn, Hg, Ni, Se, TDS	Various	Various
		Ajax Pond	NA	Ba, Mn, Hg, TDS	Various	Various
		Lucas Gulch at Ajax	0.03 ft./sec.	As, Ba, Fe, Pb, Mn, Hg, TDS, DO	Various	Various
	~1/4 mile	Granite Creek	NA	As, Ba, Hg	Various	Various
Sediment	On site	Lucas Gulch at Magnolia	NA	An, As, Cd, Cr, Cu, Pb, Mn, Hg, Ni, Ag, Zn	Various	Various
		Magnolia Pond	NA	Sb, As, Cd, Cr, Cu, Mn, Hg, Ni, Ag, Zn	Various	Various
	On site	Lucas Gulch at Ajax	NA	Sb, As, Cd, Cu, Pb, Mn, Hg, Ni, Ag, Zn	Various	Various
		Ajax Pond	NA	Sb, As, Cd, Cu, Mn, Hg, Ni, Zn	Various	Various
	~1/4 mile	Granite Creek	NA	Sb, As, Cd, Cu, Pb, Ag, Zn	Various	Various
Soil/Waste	On site	Magnolia Pond	NA	Al, Sb, As, Ba, Be, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, Zn	Various	Various
		Magnolia Test Areas	NA	Al, Sb, As, Ba, Cr, Pb, Mn, Hg, Se, Ag, Tl, V, Zn	Various	Various
Soil/Waste	On site	Magnolia Waste Piles	NA	Al, Sb, As, Ba, Be, Cr, Cu, Pb, Mn, Hg, Ni, Se, Ag, Tl, V, Zn	Various	Various
		Ajax Waste Piles	NA	Al, Sb, As, Ba, Be, Cr, Cu, Mn, Hg, Se, Tl, V, Zn	Various	Various

ADDITIONAL STUDIES

Biological studies that show a decrease in the number and lower species diversity downstream of the site: Yes ____ No x

Increased mortality in nesting wildlife: Yes ____ No x

Other critical contaminant information:

Appendix D

Copies of Supporting Information

HISTORIC OWNERS AND OPERATORS OF THE MAGNOLIA AND AJAX MINES:

Magnolia Mine:

1895 Magnolia Claim Group:

1. 1895, Michael Manley – locator
2. 1895 - 1903, John Coyle – locator/owner
3. 1895 - 1910, P.A. Conde – locator/owner
4. 1896 - 1915, A.P. Jones – locator/owner, J.T. Jones – locator/owner
5. 1899 - 1900, W.L. Vinson – locator/owner
6. 1899, J.K. Muir – locator
7. 1900 - 1910, Little Giant Gold Mining Company, Limited, Liverpool, England – purchase/owner
8. 1901, C.A. Johns – purchase
9. 1901, T.W.B. London – purchase
10. 1903 - 1916, Mary Thornburg – purchase/owner
11. 1910, Seymour Bell and J.T. Donnely – possible owners/employees of Little Giant
12. 1910 – 1915 (assumed, no records of sale found), Fred Sharp – purchase/owner
13. 1910 - 1915, W.J. Patterson – purchase, specifically listed 10-stamp mill in deed, owner
14. 1901 - 1916, Addie Jones – purchase (married to A.P. Jones)/owner
15. 1916 - 1917, Wm. J. Lachner – purchase/owner
16. 1916 – 1939 (deceased), W.A. Boyce – purchase, later operator/agent for Goddard-Hayes, owner
17. 1916 - 1918 (lost property in judgement), Goddard-Hayes Mines Company – purchase (Roland H. Goddard– Secretary, Maryett Goddard – President, J.J. Hayes - President), owner
18. 1917, Goddard and Company – purchase
19. 1918 - 1923, J.J. O'Dair – purchase/owner
20. 1919 - 1920, Ida Lachner – purchased Helena with mill, owner
21. 1934, Golden Center Mines, Inc. – operator
22. 1936, Mining and Development Corp (Deleware) – operator
23. 1934 - 1940, R.B. McGinnis – Manger for Golden Center Mines, Inc.
24. 1939 - 1940, Harry Cassidy – operator for Golden Center Mines, Inc.
25. 1939 - 1949, Heirs of W.A. Boyce – James, Tom M., Milledge E. and Gilbert Boyce, owners
26. 1941 – 1952 (last record for Wilder), Vida V. Wilder – owner
27. 1949 – 1974, Richard E. and Charles M. Boyce – purchase/owner
28. 1974 – 1996 (property enters Trust in 1983), Roger Milliken – purchase/owner
29. 1974 – 1996 (property enters Trust in 1984), Ora R. Kingsley – purchase/owner
30. 1974 – 1996 (property enters Trust in 1984), Ora K. Smith – purchase/owner
31. 1979 – 1989 (Several employees used during this time period), W.A. Bowes, Inc – operator
32. 1989, K-M Minerals, Inc. – operator
33. 1990 – 1991, Tom Van Diepan – operator
34. 1991, Tony Moreno – operator
35. 1991, Widland Contractors, Inc – operator
36. 1992, Patrick Cassidy – operator
37. 1992, Dallas Wilson – operator

38. 1994 – 1996, Mickey Guinn – operator
39. 1994 – 1996, Carl Barney – operator
40. 1994 – 1996, Bill Noones – operator
41. 1994 – 1996, Bill Dobell – operator

Claims dropped in 1996

1965 Magnolia Group

1. 1965 – 1997 (deceased), H.W. Sipp – locator/owner
2. 1965 – 1979, F.H. Day – locator/owner
3. 1965 – 1979, C.H. Murphey – locator/owner
4. 1971 – 1972, J. Swindle – operator
5. 1971 – 1972, Bud Morrow – operator
6. 1973, C. Temple – operator
7. 1974, Cameron Daggett – operator
8. 1974 – 1980, Dan Sipp – operator
9. 1976 – 1986, Dick Sipp – operator
10. 1975 - 1977, Tom Langton – operator
11. 1976 – 1978, Terry Valentine – operator
12. 1978 – 1988, C.R. Sipp –operator
13. 1979 – 1980, D.E. Smith – operator
14. 1982, Aden Allen – operator
15. 1982 – 1989, Joe, Adam & Norman Brooks – operators
16. 1987, Ben Finks – operator
17. 1990 – 1994, Fred Quimby Mining and Construction – operator
18. 1994 – 2001, Keystone Mining Co (Jeff Young) – operator
19. 1984 – 2001, Gentria Sipp – owner
20. 1997 – 2001, Eleanor Sipp – owner

Claims dropped by BLM in 1998, they continued filing until 2001

Ajax Mine:

1. 1895, Daniel Boyce – locator
2. 1895 – 1905, James McCourt – locator/owner
3. 1895, John Coyle – locator
4. 1896 – 1899, W.W. Looney – purchase/owner
5. 1896 – 1899, Thas McEuen – purchase/owner
6. 1896 – 1898, E.E. Thornburg – purchase/owner
7. 1898 – 1902, John English – purchase/owner
8. 1899 – 1917, George Graham – locator/owner
9. 1899, Samuel Kelly – purchase (?)
10. 1899 – 1916, P.A. & Nettie Conde – purchase/owner
11. 1899 – 1916, John T. Jones – purchase/owner
12. 1899 – 1916, Helen Richardson – purchase
13. 1899 – 1902, L. Butler – locator/owner
14. 1899 – 1902, Matt Walter – locator/owner
15. 1899 – 1902 (?), W.L. Vinson – locator/owner
16. 1900 – 1912, A.P. Jones – purchase/owner

17. 1902, William Crowe – locator
18. 1902 – 1916, Finlay McDonald – purchase/owner
19. 1905 – 1940 (deceased), J.J. O'Dair – purchase/owner
20. 1909 – 1916 (?), Fred Sharp – purchase/owner
21. 1917 - 1935, Wm. Lachner – purchase/owner
22. 1940 – 1950, Estate of J.J. O'Dair – inheritance
23. 1950 – 1951, Bertha O'Dair – inheritance
24. 1950 - ?, Neva (Short) O'Dair – inheritance
25. 1950 – 1996, Rosemary (Guinn Burton) O'Dair – inheritance
26. 1951 – 1972, Jack Short – operator
27. 1951 – 1972, Jack Guinn – operator
28. 1968 - 1972, Henry Potts – operator
29. 1970 - 1991, Vern Guinn – operator
30. 1974 – 1992 (property enters Trust in 1984), Roger Milliken – lessee, Ora R. Kingsley – lessee, Ora K. Smith – lessee
31. 1979 – 1989, W.A. Bowes, Inc – operator
32. 1990 – 1991, Tom Van Diepan – operator
33. 1991, Tony Moreno – operator
34. 1991, Widland Contractors, Inc – operator
35. 1992, Patrick Cassidy – operator
36. 1992, Dallas Wilson – operator
37. 1994 – 1996, Mickey Guinn – operator
38. 1994 – 1996, Carl Barney – operator
39. 1994 – 1996, Bill Noones – operator
40. 1994 – 1996, Bill Dobell – operator,

Claims dropped in 1996

OREGON NATURAL HERITAGE INFORMATION CENTER

Institute for Natural Resources

OREGON STATE UNIVERSITY
1322 SE Morrison Street
Portland, Oregon 97214-2423

September 15, 2003

Jeryl Kolb
EA Engineering, Science, and Technology
12011 Bellevue-Redmond Road, Suite 200
Bellevue, WA 98005

Dear Mr. Kolb:

Thank you for requesting information from the Oregon Natural Heritage Information Center (ORNHIC). We have conducted a data system search for rare, threatened and endangered plant and animal records for your Ajax, Blackjack, and Monumental Mine sites in Township 8 South, Range 35.5 East, Section 22; Township 9 South, Range 35 East, Section 14; and Township 9 South, Range 36 East, Section 18, W.M., respectively.

Six (6) records were noted within a two-mile radius of your project and are included on the enclosed computer printout. A key to the fields is also included.

Please remember that the lack of rare element information from a given area does not mean that there are no significant elements there, only that there is no information known to us from the site. To assure that there are no important elements present, you should inventory the site, at the appropriate season.

Please note that at this time ORNHIC does not have comprehensive computerized records available for all anadromous fish in Oregon. I have listed below the species that may be present within the waterways contained in the project area. I have also included their listing by the National Marine Fisheries Service (NMFS). For more information on anadromous fish you may wish to contact NMFS at: 525 NE Oregon Street; Portland, Oregon 97232-2737. Please also note that the U.S. Fish and Wildlife Service now has jurisdiction over coastal cutthroat trout.

Steelhead (Middle Columbia River)	*Oncorhynchus mykiss*	Threatened

This data is confidential and for the specific purposes of your project and is **not to be distributed.**

If you need additional information or have any questions, please do not hesitate to contact me.

Sincerely,

Cliff Alton
Conservation Information Assistant

encl.: invoice (H-091503-CWA1)
computer printout and data key

STATE OF OREGON

DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES

1069 STATE OFFICE BUILDING
PORTLAND 1, OREGON

Bulletin No. 49

LODE MINES OF THE CENTRAL PART
of the
GRANITE MINING DISTRICT, GRANT COUNTY, OREGON

By

George S. Koch, Jr.
Assistant Professor of Geology
Oregon State College

1959

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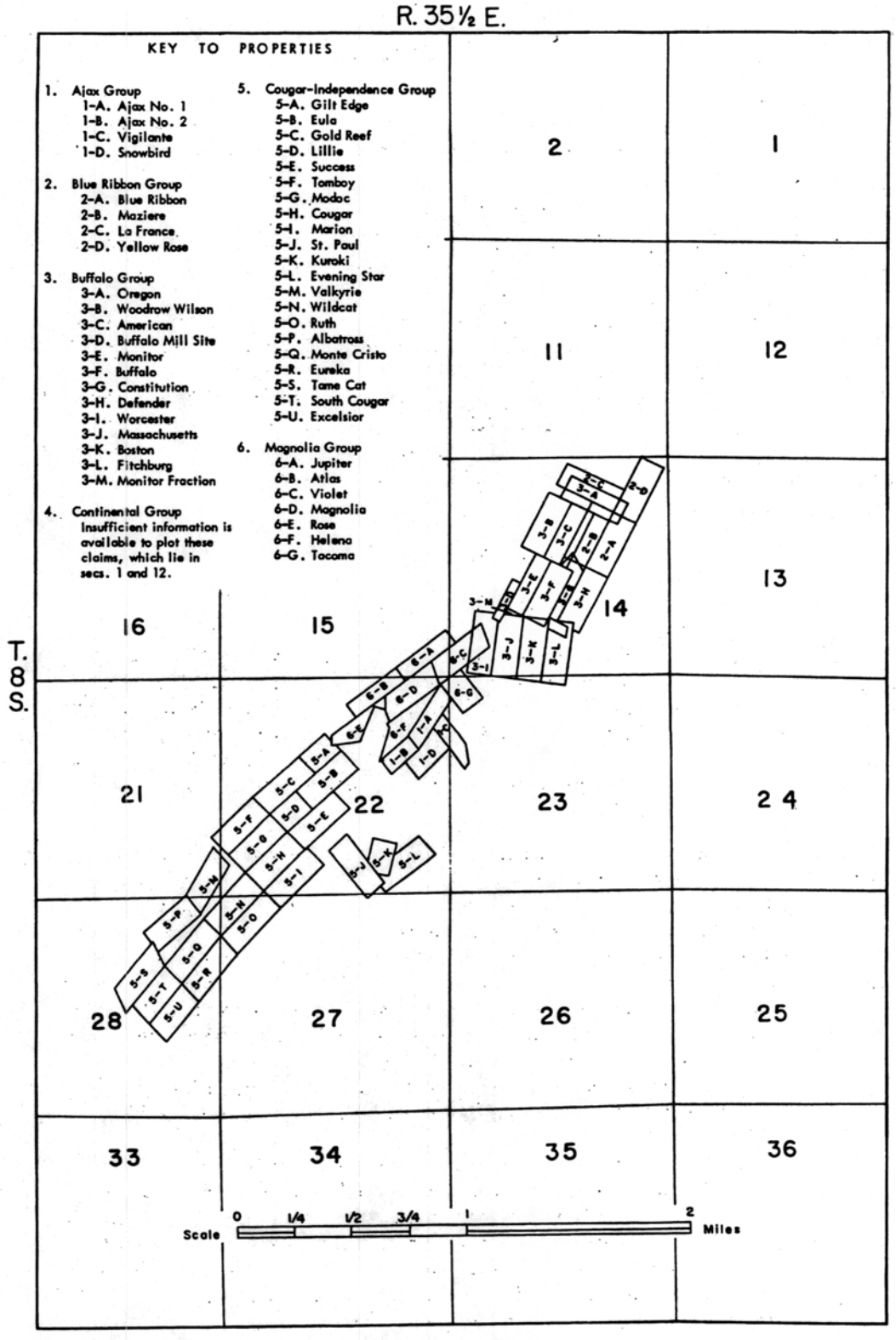

Figure 4 - Granite district. Sketch map showing locations of some of principal claims. Compiled from sources of varying reliability and accuracy.

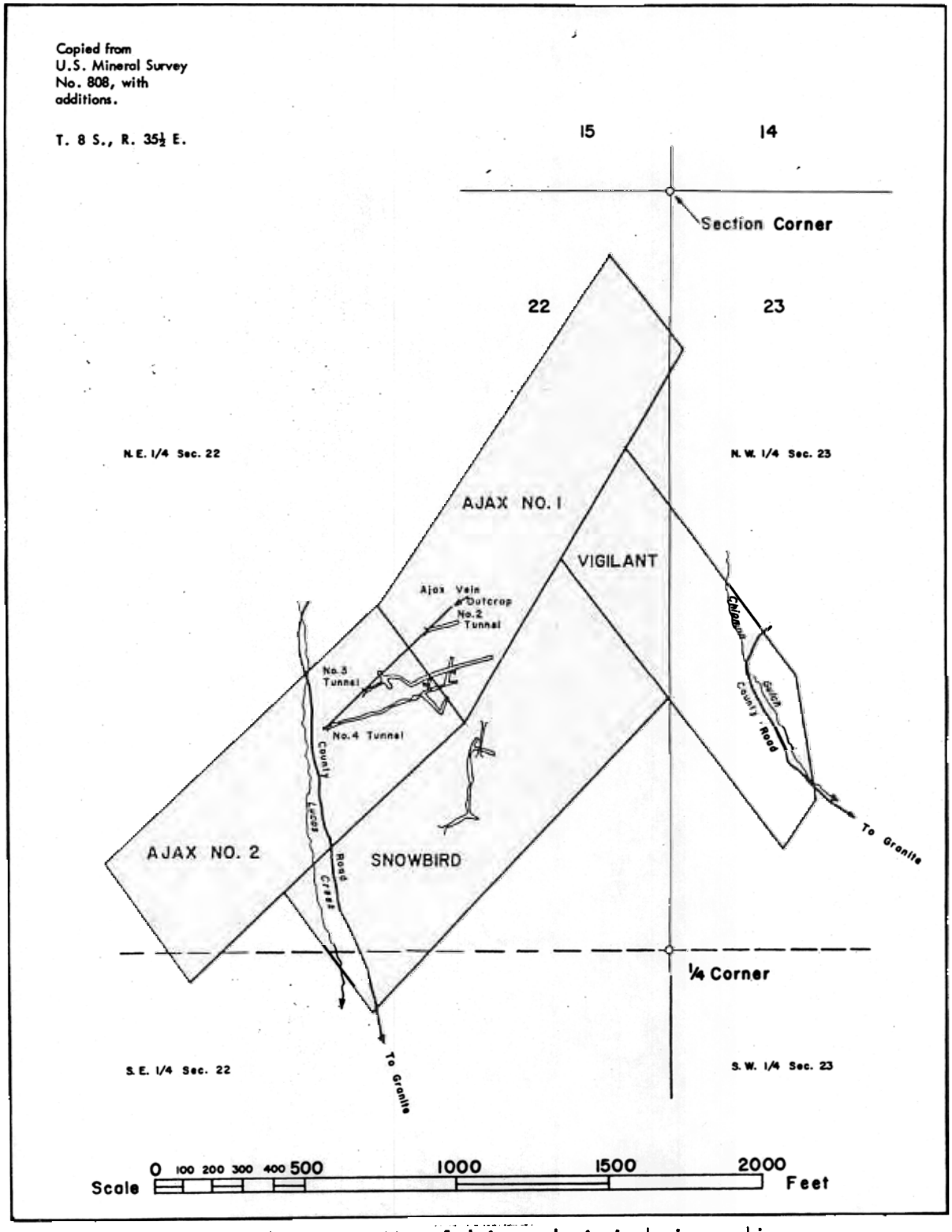

Figure 5 - Ajax mine. Map of claims and principal mine workings.

Ajax Mine

General description

The Ajax mine is about 3 miles north of Granite on Lucas Creek (Figure 3, opposite page 9) and is connected with the forest road along Granite Creek by a good road. The property consists of four unpatented lode claims, Ajax No. 1, Ajax No. 2, Snowbird, and Vigilant (Figure 4, opposite page 11). On these claims two veins crop out, the Ajax vein which is developed by drifts on three levels and the Snowbird vein which is developed by drifts on two levels (Figure 5 on opposite page). Most of the gold production was apparently obtained between 1905 and 1906 when $40,000 worth of ore is said to have been taken from a shoot 90 feet long in the No. 3 tunnel on the Ajax vein. In recent years there has been little development work and little or no production. The present owner is Mrs. Rosemary L. Guinn, Route 2, Box 558, Washougal, Washington. Mr. Jack Guinn allowed the writer to inspect the property and gave useful information.

Geology

The country rock is entirely argillite. Although all of the upper tunnels are caved and only a part of the No. 4 tunnel was accessible in 1957 (Figure 5), surface outcrops and plans of the inaccessible workings indicate that the strikes and dips of the veins and their character probably are like those visible in the No. 4 tunnel.

Where exposed for 370 feet by the No. 4 tunnel (Figure 6) the Ajax vein ranges in width from 1 inch or less to 4 feet, generally widening somewhat where it swings to the left.

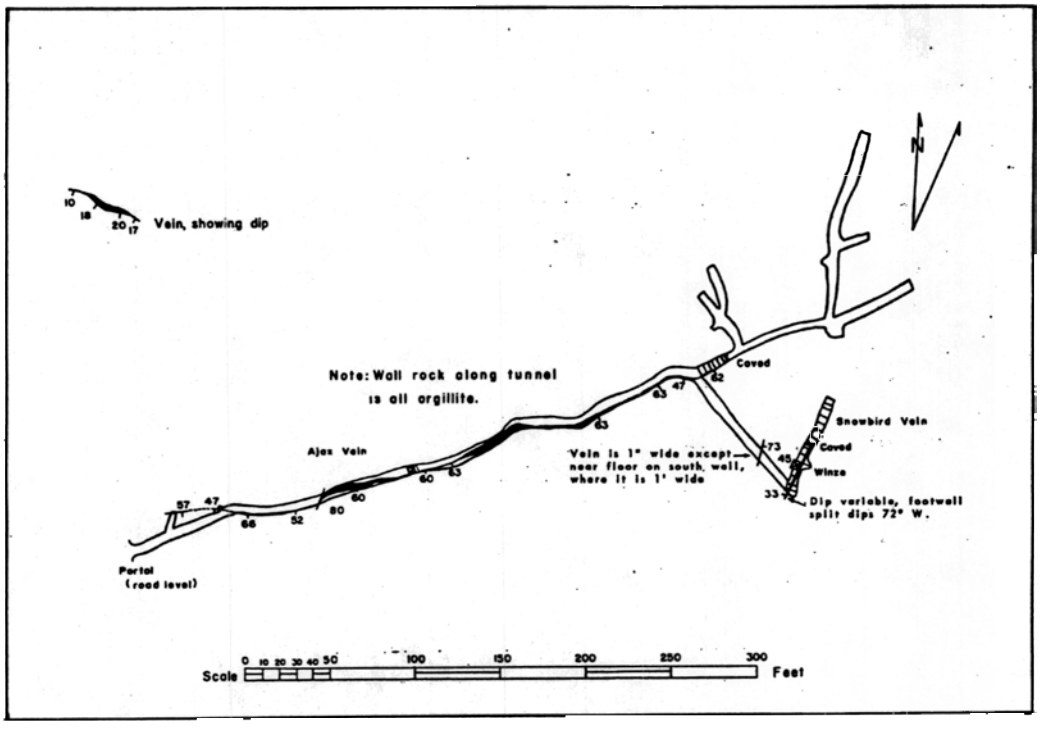

Figure 6 - Ajax mine. Geologic map of No. 4 tunnel (at road level). Caved portions of workings from map by John E. Allen, 1938.

attributed to downward enrichment, following the weathering and erosion of the superficial portion of the vein. The extent of exploration on the vein, however, does not warrant a statement of the extent to which ore has been enriched by this process.

"Several light decomposed dikes, 2 to 4 feet wide, with southeast courses, have been found in both walls. These terminate against the vein and indicate that it fills a fault fissure, although the amount of displacement has not been determined."

Mill, camp, and equipment

The mill and equipment were described in the Oregon Metal Mines Handbook (Oregon Department of Geology and Mineral Industries, 1941, p. 49). Most of this is gone, although some of the houses in the once extensive camp remain in good condition.

Magnolia Mine

General description

The Magnolia mine is on Lucas Creek about 3½ miles north of Granite (Figure 3, opposite page 9) and is connected with the forest road along Granite Creek by a good road. There are seven unpatented lode claims: Jupiter, Atlas, Violet, Magnolia, Rose, Helena, and Tacoma (Figure 4, opposite page 11). The mine worked one vein, the Magnolia (Figure 2, opposite page 5), which is developed by an adit (Figure 23, in pocket) about 1050 feet in length whose portal is near the level of Lucas Creek and by shorter adits and pits on the hillside northeast of the creek. Lindgren (1901, p. 684) states that the Magnolia mine began operation in 1899 when a 10-stamp mill was built, and ore containing an unknown, but certainly small, amount of gold was extracted until about 1904 (Pardee and Hewett, 1914, p. 105). Evidently most of the work accomplished after 1904 consisted of driving the principal adit about 100 feet.

The writer was allowed to inspect the Magnolia property through the courtesy of Mr. Richard E. Boyce, West 41-37 Avenue, Spokane, Washington, who holds a 2/5 interest in the mine. Mr. C. M. Boyce of St. Maries, Idaho, has another 2/5 interest, and Mrs. Vida V. Wilder, 816 Westford Street, Lowell, Massachusetts, has the remaining 1/5 interest. Mr. Boyce also supplied an assay map (Figure 23) of the main adit made by Mr. Ed McAllister and Mr. Harold Culp of the Cougar-Independence Company.

Geology

On the surface the Magnolia vein is clearly exposed from the portal of the main adit northeastward to where the vein, if still present, is covered by the younger volcanic rocks of Tertiary age (Figure 2). The vein has not been found to the southwest of the main adit, but it is probable that a detailed inspection of the heavily wooded hillside between the main adit and the outcrop of the Independence vein, perhaps aided by some trenching, would indicate that the Independence and Magnolia veins are the same.

In 1957 the upper workings on the Magnolia vein were caved and the main adit was caved at a point about 650 feet from the portal (Figure 23, in pocket). The accessible part of the vein is almost entirely timbered so that the rocks and vein are not exposed. About 500 feet from the portal the vein is visible where it was stoped to a height averaging about 20 feet above the level. There the vein is 2½ to 3 feet in width and composed of black-to-white gouge with sharp, distinct walls indicating a strong fracture of the argillite. No sulfide minerals or gangue of quartz or calcite were noted. Measurements in the stope and elsewhere indicate that the strike of the vein is consistently about N. 58° E. and that the dip is con-

Appendix E

Aquatic and Terrestrial Species Tables

APPENDIX E - AQUATIC AND TERRESTRIAL SPECIES TABLES

Number	Title
E-1	Sensitive and listed animal species potentially occurring in Grant County, Oregon.
E-2	Wildlife and fish species observed at the Magnolia and Ajax Mines, July 2003.
E-3	Sensitive plant species, North Fork John Day Ranger District, Umatilla National Forest, 2001.
E-4	Plant species observed at Magnolia and Ajax Mines, July 2003.

Table E-1. Sensitive and Listed Animal Species Potentially Occurring in Grant County, OR

Species	Federal and (State) Status	Habitat
BIRDS		
Bald Eagle	LT, (LT)	Unlikely since insufficient water nearby
Black-backed woodpecker	(SC)	High elevation forest
Boreal Owl	(SU)	High elevation forest
Flammulated Owl	(SC)	Ponderosa Pine
Great Gray Owl	(SV)	High elevation forest
Lewis's Woodpecker	SoC, (SC)	Forested areas
Loggerhead Shrike	(SV)	Lower elevations
Northern Goshawk	SoC, (SC)	Will be checked in Heritage database
Northern Pygmy Owl	(SC)	Forested areas
Peregrine Falcon	(LE)	Will be checked in Heritage database
Pileated Woodpecker	(SV)	Forested areas
Pine grosbeak	(S2?)	High elevation forest
Pygmy Nuthatch	(SC/SV)	Ponderosa Pine
Olive-sided Flycatcher	SoC, (SV)	Forested areas
Three-toed Woodpecker	(SC)	High elevation forest
Willow Flycatcher	SoC, (SU)	Riparian areas
White headed Woodpecker	SoC, (SC)	Ponderosa Pine
MAMMALS		
Big-eared Bat	SoC, (SC)	May use mine sites for roosting
Canada Lynx	LT	Unlikely to encounter
Fisher	SoC, (SC)	Unlikely to encounter
Fringed Bat	SoC, (SV)	May use mine sites for roosting
Hoary Bat	(S4?)	Unlikely to use mines
Hoary Bat	(S4?)	Unlikely to use mines
Long-eared Bat	SoC, (SU)	May use mine sites for roosting
Long-legged Bat	SoC, (SU)	May use mine sites for roosting
Marten	(SV)	Unlikely to encounter
Pallid Bat	SoC, (SV)	Lower elevation
Preble's shrew	SoC	Unlikely at over 5000 ft.
Pygmy Rabbit	SoC, (SV)	Lower elevation
Silver-haired bat	SoC, (SU)	Unlikely to use mines
Small-footed Bat	SoC, (SU)	May use mine sites for roosting
Wolverine	SoC, (LT)	Will be checked in Heritage database
Yuma Bat	SoC	May use mine sites for roosting
REPTILES AND AMPHIBIANS		
Spotted Frog (*Rana luteiventris)*	-, (SU)	ONHIC shows on Granite Creek
Painted Turtle (*Chrysemys picta)*	-, (SC)	

Species	Federal and (State) Status	Habitat
Northern Sagebrush Lizard	SoC, (SV)	Elevation on Clear Creek may be too high
FISH		
Inland redband (rainbow) trout (*Oncorhynchus mykiss*)	SoC, (SV)	
Malheur mottled sculpin (*Cottus bendirei)*	SoC, (SC)	Unlikely in Clear Creek.
Westslope cutthroat trout (*Oncorhychus clarki lewisi*)	SoC, (SV)	
Bull trout (*Salvelinus confluentus*)	SoC, (SC)	Unlikely in Clear Creek.

NOTE:
LE = Listed Endangered, state or federal.
LT = Listed Threatened, state or federal.
SoC = Federal Species of Concern; under review by US Fish and Wildlife Service.
Oregon Fish and Wildlife Commission, Sensitive Species:
- S2 = Imperiled.
- SC = Critical, listing is pending or may be appropriate.
- SV = Vulnerable; population declining, but listing not imminent.
- SP = Peripheral or naturally rare.
- SU = Undetermined status.

Source: Oregon Natural Heritage Program (2001).

Table E-2. Wildlife Species Observed at Magnolia and Ajax Mine Sites, July 2003.

Scientific Name	Common Name	Comments
Birds		
Buteo jamaicensis	Red-tailed Hawk	Seen once flying over
Chordeiles minor	Common Nighthawk	Fly over one day
Picoides villosus	Hairy woodpecker	Heard calling on hillside
Sphyrapicus nuchalis	Red-naped Sapsucker	Heard calling on hillside
Colaptes auratus	Northern Flicker	Seen on hillside
Sitta canadensis	Red-breasted nuthatch	Heard in forest
Poecile gambeli	Mountain chickadee	Heard in *forest*
Regulus satrapa	Golden-crowned	Kinglet Heard in forest
Cyanocitta stelleri	Steller's Jay	Fly over
Corvus corax	Common Raven	Fly over
Nucifraga columbiana	Clark's Nutcracker	Fly over
Turdus migratorius	American Robin	Present along stream
Catharus guttatus	Hermit Thrush	Heard calling on hillside
Piranga ludoviciana	Western Tanager	Heard calling in conifers
Dendroica coronata	Audubon's Warbler	Territorial defense on hillside
Dendroica sp.	Unknown warbler	Townsend's?
Junco hymenalis	Dark-eyed Junco	Present on hillside
Vireo sp.	Exact species unknown	Nest found on ground in riparian zone just downstream of Magnolia Mine.
Mammals		
Microtus sp.	Vole species	
Eutamias amoenus	Yellow Pine Chipmunk	
Odocoileus hemoionus	Mule deer	Evidence in scat
Reptiles and Amphibians		
None Observed		
Fish		
Oncorhynchus spp	Redband and/or Cutthroat trout	

Table E-3. Sensitive Plant Species, North Fork John Day Ranger District, Umatilla National Forest, 2001

Scientific Name	Federal and (State) Status	Habitat
Allium campanulatum	(HS)	MONT
Allium madidum	(HS)	MWM
Allium tolmiei platyphyllum	(HS)	CF
Allium validum	(HS)	R, MWM
Astragalus reventus	(HS)	R, MONT
Botrychium crenulatum	SoC, (C)	R, MWM
Botrychium lanceolatum	(S)	R, MWM
Botrychium lunaria	(S)	R, MWM
Botrychium minganense	(S)	R, MWM
Botrychium montanum	(S)	R, MWM
Botrychium paradoxum	SoC, (C)	R, MWM
Botrychium pedunculosum	SoC, (C)	R, MWM
Botrychium pinnatum	(S)	R, MWM
Botrychium simplex	(HS)	MF
Calypso bulbosa	(HS)	MF
Castilleja glandulifera	(HS)	A, RCB
Carex interior	(S)	R, MWM
Calochortus longebarbatus longebarbatus	(S)	R, MWM
Corallorrhiza trifida	(HS)	A, MWM
Cypripedium montanum	(HS)	MF
Eriogonum thymoides	(HS)	SB-PJ
Lupinus burkei s. burkei (L. polyphyllus)	(HS)	R, MWM
Lycopodium annotinum	(HS)	MF
Mimulus washingtonensis	(HS)	MWM
Orobanche pinorum	(HS)	CF
Pedicularis bracteosa pachyrhiza	(HS)	A
Penstemon pennellianus	(HS)	MF
Polystichum lemmonii (P. mohricides)	(HS)	SERP
Ribes hudsonianum	(HS)	MONT, R, MWM
Ribes oxyacanthoides s. cognatum	(HS)	MONT, R
Silene scaposa scaposa	(HS)	SB-PJ
Trifolium douglasii	SoC	R, MWM
Trifolium plumosum s. plumosum	(HS)	MONT, RCB

Habitat Key:

A	=	Alpine.	R	=	Riparian, Aquatic.
CF	=	Conifer Forest	RCB	=	Rock outcrops, cliffs, or bluffs.
MF	=	Moist Forest	SB-PJ	=	Sagebrush-Pinon Juniper Forest
MONT	=	Mountains	SERP	=	Serpentine
MWM	=	Moist and Wet Meadows.			

(C) = State Candidate/Sensitive species.
(HS) = Historically State Sensitive.
(S) = State Sensitive.
SoC = Species of Concern (Federal)

Federal status information obtained from Oregon Natural Heritage Program (ONHP) database, 2001.

Habitat information obtained from Hitchcock and Cronquist, 1973.

Table E-4. Plant Species Observed at the Magnolia and Ajax Mine sites, July 2003.

Scientific Name	Common Name
Trees	
Abies amabilis	Silver Fir (planted)
Abies grandis-concolor	Grand Fir Successional
Alnus incana	Red alder (small shrubby plants)
Larix occidentalis	Larch (on hillside)
Picea engelmanii	Spruce
Pinus contorta	Lodgepole Pine
Pinus ponderosa	Ponderosa Pine
Populus sp.	Cottonwood (a few plants on Granite Creek)
Pseudotsuga menziesii	Douglas fir
Salix sp	willow species (not flowering)
Woody Shrubs	
Amelanchier alnifolia	Serviceberry/ Saskatoon
Arctostaphylos uva-ursi	Kinickinick
Cornus stolonifera	Red-osier Dogwood at confluence with Granite Creek
Ribes sp	Swamp gooseberry, likely *lacustre*
Ribes sp.	Red currant
Sambucus cerulea	Blue elderberry
Sambucus canadensis	Red elderberry
Vaccinium scoparium	whortleberry/grouseberry
Vaccinium sp.	blueberry/huckleberry sp.
Grasses and Forbs	
Acontium sp.	Larkspur species
Aquilegia sp. (formosa ?)	Columbine species
Carex sp.	Sedge species
Castilleja sp.	Paintbrush
Claytonia sp. (*lanceolata* ?)	Miner's lettuce/Springbeauty species
Delphinium sp.	Larkspur species
Equisetum sp.	Horsetail species
Juncus sp.	Soft rush species, likely *effusus*
Festuca sp.	Fescue, likely idahoensis
Epilobium spp.	Fireweed, several species, likely *angustifolium*
Fragaria sp (*vesca* and *virginiana)*	Wild Strawberry
Gallium sp.	Bedstraw sp.
Geum sp.	Large-leaved Avens (likely *macrophyllum*)
Goodyera oblongifolia	Rattlesnake plantain
Linnaea borealis	Twinflower
Lupinus sp.	Lupine species
Mimulus sp. (*guttatus*?)	Yellow monkeyflower
Mimulus sp. (*lewisii* ?)	Pink monkeyflower
Planthera sp. (*dilatata* ?)	White bog orchid (not
Potentilla sp	Cinquefoil species
Rannunculus sp. (uncinatus?)	Buttercup species

Table E-4 cont.

Scientific Name	Common Name
Saxifrage sp.	Saxifrage species
Sedum sp.	Stonecrop species
Silene sp.	Bladder campion species
Thalictrum occidentale	Meadowrue
Trifolium sp.	Clover species
Viola sp.	Violet species (no flowers present)

Appendix F

Detailed Wetlands Description

Appendix F – Detailed Wetlands Assessment

A wetland assessment was performed by a field biologist at both Ajax and Magnolia Mine sites during the SI investigation. Wetland information was obtained by comparing information on the National Wetlands Inventory (NWI) maps to observations recorded in the field, and then verifying these using wetland definitions in 40 CFR 230.3 (CERCLA definition). This definition states that *wetlands are those areas that are inundated or saturated by surface or ground water at a frequency or duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions*. The primary difference between this definition and the NWI definition is the requirement to support a prevalence of rooted emergent hydrophytes. Areas that under normal circumstances do not support hydrophytes could be mapped under the NWI system, but would not meet the definition according to 40 CFR 230.3.

In verifying field and NWI information against the CERCLA definition, a matrix comparing the two systems was used (USEPA 1992). This table lists the NWI categories of wetland and deep-water habitats and indicates which ones would also meet the CERCLA definition. An archetypal NWI mapped wetland that also meets the CERCLA definition has the designation PEMB or PSSB. This means the wetland is palustrine, with emergent or scrub-shrub vegetation, and is saturated enough for the vegetation to be hydrophytic. A wetland designated R3UBH means upper perennial riverine, with an unconsolidated bottom and in a permanently saturated condition. This type of habitat usually does not have the emergent vegetation required for the CERCLA definition of a wetland.

The NWI 7.5-minute topographic map for the Granite quadrangle (USFWS 1994) was examined to compare with the characterization of wetlands in the vicinity of the sites. Lucas Gulch is characterized on the map as *Riverine, Upper Perennial, Unconsolidated Bottom, Permanently Flooded* (R3UBH), as are most of the permanent streams in the area. As discussed above, this classification does not meet the CERCLA definition of a wetland unless vegetation present is hydrophytic. The upper and lower ends of Lucas Gulch, including the confluence with Granite Creek, are mapped as PEMA, B, C, and PSSC (*Palustrine emergent and scrub-shrub vegetation with temporarily flooded, saturated, and seasonally flooded conditions*). All of these classifications meet the CERCLA definition of a wetland. There are also a number of palustrine ponds along Granite Creek downstream of the confluence with Lucas Gulch. These are mapped by the NWI as:

PUBHx - *Palustrine Unconsolidated Bottom, Permanently Flooded, Excavated.*
PABHx - *Palustrine Aquatic Bed, Permanently Flooded, Excavated*
PEMF - *Palustrine Emergent Vegetation, Semi-permanently Flooded*
PEMFx - *Palustrine Emergent Vegetation, Semi-permanently Flooded, Excavated*
PSSCx - *Palustrine Scrub-Shrub Vegetation, Seasonally Flooded, Excavated*

Historical placer mining activities were quite extensive along Granite Creek, and are most likely responsible for the creation of these areas.

References:

United States Environmental Protection Agency (USEPA). 1992. Hazard Ranking System Guidance Manual. Office of Solid Waste and Emergency Response. EPA540-R-92-026, OSWER Directive 9345.1-07. November.

United States Fish and Wildlife Service (USFWS). 1994. National Wetland Inventory 7 ½ Minute Quadrangle Maps, including Granite, Greenhorn, Olive Lake, and Vinegar Hill Lookout.

Appendix G

Aquatic Survey Results Summary Tables

Table G-1a. Number and relative abundance of taxa collected from riffle habitat near Magnolia and Ajax Mines, 18-19 July 2003.

Taxa	MAGN-ST-BMR-01		MAGN-ST-BMR-02		MAGN-ST-BMR-03		AJAX-ST-BMR-04	
	No.	%	No.	%	No.	%	No.	%
Turbellaria	28	4.52	1	0.43	66	6.16	5	1.70
Lumbriculidae	2	0.32	2	0.85	7	0.65	--	--
Tubificidae	18	2.91	11	4.68	15	1.40	13	4.42
Ostracoda	--	--	5	2.13	--	--	--	--
Hydracarina	14	2.26	1	0.43	4	0.37	2	0.68
Ameletus	--	--	--	--	--	--	2	0.68
Diphetor hageni	4	0.65	2	0.85	12	1.12	3	1.02
Cinygmula	--	--	12	5.11	16	1.49	15	5.10
Cinygma	32	5.17	5	2.13	20	1.87	4	1.36
Epeorus (Ironopsis)	--	--	--	--	--	--	1	0.34
Paraleptophlebia	9	1.45	4	1.70	7	0.65	1	0.34
Serratella teresa	16	2.58	2	0.85	11	1.03	7	2.38
Serratella tibialis	7	1.13	5	2.13	23	2.15	4	1.36
Drunella flavilinea	--	--	--	--	1	0.09	--	--
Drunella spinifera	2	0.32	--	--	6	0.56	2	0.68
Malenka	--	--	--	--	7	0.65	10	3.40
Zapada cinctipes	90	14.54	27	11.49	84	7.84	14	4.76
Yoraperla brevis	2	0.32	--	--	26	2.43	3	1.02
Doroneuria baumanni	7	1.13	1	0.43	15	1.40	7	2.38
Perlodidae	4	0.65	5	2.13	4	0.37	2	0.68
Paraperla	--	--	2	0.85	18	1.68	6	2.04
Sweltsa	21	3.39	32	13.62	31	2.89	15	5.10
Rhyacophila	14	2.26	--	--	4	0.37	--	--
Rhyacophila brunnea grp.	4	0.65	3	1.28	40	3.73	2	0.68
Hydroptila	14	2.26	2	0.85	8	0.75	2	0.68
Micrasema	99	15.99	5	2.13	44	4.10	3	1.02
Neophylax	--	--	2	0.85	--	--	2	0.68
Cryptochia	2	0.32	1	0.43	--	--	1	0.34
Homophylax	2	0.32	2	0.85	7	0.65	--	--
Lepidostoma	2	0.32	--	--	7	0.65	3	1.02
Cleptelmis ornata	7	1.13	1	0.43	55	5.13	3	1.02
Heterlimnius corpulentus	8	1.29	21	8.94	94	8.77	41	13.95
Heterlimnius koebelei	90	14.54	3	1.28	--	--	--	--
Narpus concolor	--	--	--	--	1	0.09	--	--
Optioservus quadrimaculatus	--	--	--	--	4	0.37	--	--
Tropisternus	--	--	--	--	2	0.19	--	--
Helophorus	--	--	1	0.43	--	--	--	--
Paracymus	--	--	--	--	4	0.37	--	--
Ceratopogoninae	--	--	1	0.43	--	--	1	0.34
Tanypodinae	4	0.65	2	0.85	--	--	--	--
Pentaneurini	4	0.65	2	0.85	33	3.08	9	3.06
Diamesinae	4	0.65	5	2.13	59	5.50	8	2.72
Orthocladiinae	21	3.39	25	10.64	141	13.15	25	8.50
Chironomini	--	--	--	--	--	--	1	0.34
Tanytarsini	4	0.65	12	5.11	29	2.71	26	8.84
Dixa	--	--	--	--	4	0.37	2	0.68
Simulium	32	5.17	23	9.79	51	4.76	3	1.02
Pedicia	14	2.26	5	2.13	22	2.05	2	0.68
Clinocera	--	--	1	0.43	--	--	1	0.34
Glutops	--	--	--	--	--	--	2	0.68
Hydrobiidae	18	2.91	1	0.43	90	8.40	41	13.95
Pisidium	20	3.23	--	--	--	--	--	--
Total	619	100.00	235	100.00	1,072	100.00	294	100.00

Table G-1b. Number and relative abundance of taxa collected from riffle habitat in Granite Creek near Magnolia and Ajax Mines, 18-19 July 2003.

Taxa	GRAN-ST-BMR-53		GRAN-ST-BMR-54	
	No.	%	No.	%
Turbellaria	72	6.59	38	2.28
Lumbriculidae	--	--	12	0.72
Tubificidae	315	28.85	260	15.62
Hydracarina	27	2.47	12	0.72
Ameletus	--	--	6	0.36
Baetis tricaudatus	46	4.21	57	3.42
Diphetor hageni	--	--	6	0.36
Cinygmula	29	2.66	18	1.08
Epeorus (Ironopsis)	4	0.37	6	0.36
Paraleptophlebia	--	--	14	0.84
Caudatella	5	0.46	--	--
Serratella teresa	19	1.74	12	0.72
Serratella tibialis	27	2.47	48	2.88
Drunella spinifera	6	0.55	1	0.06
Malenka	--	--	18	1.08
Zapada cinctipes	5	0.46	--	--
Yoraperla brevis	66	6.04	236	14.17
Doroneuria baumanni	2	0.18	--	--
Hesperoperla pacifica	4	0.37	96	5.77
Kogotus	1	0.09	--	--
Paraperla	5	0.46	--	--
Sweltsa	4	0.37	21	1.26
Wormaldia	--	--	14	0.84
Parapsyche elsis	4	0.37	--	--
Rhyacophila	12	1.10	--	--
Rhyacophila alberta grp.	--	--	6	0.36
Rhyacophila brunnea grp.	--	--	27	1.62
Rhyacophila verrula grp.	3	0.27	--	--
Hydroptila	4	0.37	--	--
Brachycentrus americanus	5	0.46	19	1.14
Micrasema	161	14.74	134	8.05
Neophylax	1	0.09	--	--
Lepidostoma	8	0.73	--	--
Brychius	4	0.37	--	--
Cleptelmis ornata	20	1.83	132	7.93
Heterlimnius koebelei	17	1.56	17	1.02
Narpus concolor	4	0.37	1	0.06
Zaitzevia parvula	--	--	6	0.36
Ceratopogoninae	8	0.73	--	--
Pentaneurini	4	0.37	6	0.36
Diamesinae	46	4.21	78	4.68
Orthocladiinae	93	8.52	183	10.99
Chironomini	4	0.37	6	0.36
Tanytarsini	19	1.74	114	6.85
Dixa	--	--	--	--
Simulium	31	2.84	12	0.72
Pedicia	4	0.37	30	1.80
Clinocera	--	--	1	0.06
Glutops	--	--	18	1.08
Pisidium	3	0.27	--	--
Total	1,092	100.00	1,665	100.00

Table G-1c. Number and relative abundance of taxa collected from pool habitat in Granite Creek near Magnolia and Ajax Mines, 18-19 July 2003.

Taxa	GRAN-ST-BMP-53		GRAN-ST-BMP-54	
	No.	%	No.	%
Turbellaria	21	4.46	36	4.85
Lumbriculidae	--	--	16	2.15
Tubificidae	82	17.41	155	20.86
Ostracoda	11	2.34	86	11.57
Hydracarina	5	1.06	19	2.56
Ameletus	8	1.70	16	2.15
Baetis tricaudatus	43	9.13	6	0.81
Diphetor hageni	29	6.16	--	--
Cinygmula	10	2.12	--	--
Cinygma	5	1.06	--	--
Paraleptophlebia	4	0.85	7	0.94
Serratella teresa	7	1.49	3	0.40
Serratella tibialis	16	3.40	--	--
Drunella spinifera	5	1.06	7	0.94
Malenka	5	1.06	3	0.40
Yoraperla brevis	26	5.52	3	0.40
Hesperoperla pacifica	6	1.27	20	2.69
Kogotus	5	1.06	--	--
Paraperla	2	0.42	3	0.40
Sweltsa	7	1.49	9	1.21
Rhyacophila	9	1.91	--	--
Rhyacophila brunnea grp.	4	0.85	--	--
Hydroptila	2	0.42	--	--
Micrasema	10	2.12	--	--
Dicosmoecus gilvipes	--	--	1	0.13
Psychoglypha	2	0.42	9	1.21
Lepidostoma	14	2.97	3	0.40
Oreodytes	--	--	23	3.10
Cleptelmis ornata	9	1.91	--	--
Heterlimnius koebelei	8	1.70	--	--
Narpus concolor	1	0.21	--	--
Ceratopogoninae	4	0.85	--	--
Tanypodinae	2	0.42	19	2.56
Pentaneurini	5	1.06	19	2.56
Diamesinae	11	2.34	31	4.17
Orthocladiinae	33	7.01	71	9.56
Chironomini	2	0.42	3	0.40
Tanytarsini	23	4.88	90	12.11
Simulium	9	1.91	--	--
Dicranota	5	1.06	--	--
Molophilus	2	0.42	--	--
Pedicia	2	0.42	--	--
Clinocera	4	0.85	--	--
Glutops	5	1.06	63	8.48
Pisidium	8	1.70	22	2.96
Total	471	100.00	743	100.00

Table G-2. Summary of Level 3 Metrics and Scores for Macroinvertebrate Sampling Locations Near Magnolia and Ajax Mines, 18-19 July 2003.

Serial Number	Date	Sample Type	Sample Location	Taxa Richness	Score	Mayfly Richness	Score	Stonefly Richness	Score	Caddisfly Richness	Score	Sensitive Taxa	Score	Sediment Sensitive Taxa	Score	Modified HBI	Score	Percent Tolerant Taxa	Score	Percent Sediment Tolerant Taxa	Score	Percent Dominant (single taxa)	Score	**Total Score**
MAGN-ST-BMR-01	19-Jul-03	Riffle	1	34	3	6	3	5	3	7	3	6	5	0	1	3.3	5	6.6	5	5.5	5	16.0	5	**38**
MAGN-ST-BMR-02	19-Jul-03	Riffle	2	36	5	6	3	5	3	6	3	5	5	0	1	3.7	5	6.8	5	7.7	5	13.6	5	**40**
MAGN-ST-BMR-03	19-Jul-03	Riffle	3	39	5	8	3	7	5	6	3	6	5	0	1	3.6	5	8.3	5	4.1	5	13.2	5	**42**
AJAX-ST-BMR-04	18-Jul-03	Riffle	4	39	5	9	5	7	5	6	3	7	5	0	1	3.8	5	6.1	5	5.1	5	14.0	5	**44**
GRAN-ST-BMR-53	18-Jul-03	Riffle	53	38	5	7	3	7	5	8	3	8	5	1	3	3.9	5	31.4	3	29.2	1	28.9	3	**36**
GRAN-ST-BMR-54	18-Jul-03	Riffle	54	35	3	9	5	4	3	5	3	4	3	1	3	3.6	5	24.6	3	18.1	3	15.6	5	**36**
GRAN-ST-BMP-53	18-Jul-03	Pool	53	42	5	9	5	6	5	6	3	6	5	0	1	4.2	3	19.7	3	19.3	3	17.4	5	**38**
GRAN-ST-BMP-54	18-Jul-03	Pool	54	27	3	5	3	5	3	3	1	4	3	0	1	5.1	1	26.1	3	23.0	3	20.9	3	**24**

TABLE G-3. SUMMARY OF HABITAT ASSESSMENT SCORES
FOR MAGNOLIA AND AJAX MINES AND GRANITE CREEK SAMPLING STATIONS - JULY 2003

Habitat Parameter	Magnolia Mine Stations 01	02	03	Ajax Mine Station 04	Granite Creek Stations 53	54
Epifaunal substrate/available cover	16	13	13	13	17	16
Embeddedness	14	8	11	13	18	17
Velocity/depth regime	6	6	6	6	11	13
Sediment Deposition	19	19	19	18	12	10
Channel flow status	20	19	20	20	20	20
Channel alteration	20	20	20	20	20	20
Frequency of riffles (or bends)	20	19	20	20	20	20
Bank stability						
Left bank	10	10	10	10	9	10
Right bank	10	10	10	10	10	10
Vegetative protection						
Left bank	10	10	10	10	10	10
Right bank	10	10	10	10	10	10
Riparian vegetative zone width						
Left bank	8	5	5	6	8	9
Right bank	10	10	10	10	10	10
SCORE	173	159	164	166	175	175

Appendix H

Waste Pile Calculations

WASTE PILE CALCULATIONS – MAGNOLIA MINE AND AJAX MINE SI

Calculations performed in Land Development Desktop using Grid, Composite Surface, and the Prismoidal methods. Only the prismoidal results are reported, with the other quantities used for quality control. Other methods agree within 2% of prismoidal method.

Waste pile calculations as follows:

At Magnolia Mine:

- Waste rock pile near upper collapsed adit - 1171 cu.yds
- Waste pile near the creek at the northern end of the site in the riparian zone - 45 yds^3.
- Waste pile downgradient of the lower east portal - 13 yds^3
- Waste pile in the riparian zone near the settling ponds - 188 yds^3.
- Waste pile located on the west side of FS Road 580 near the southern end of the site, also in the riparian zone - 8 $yds^{3.}$

At Ajax Mine:

- Waste pile located near the collapsed portal - 134 yds^3
- Waste pile located on a relatively flat slope in the riparian zone of Lucas Gulch (near the settling pond) - 375 yds^3

Beau McLendon, PLS
Anderson-Perry & Associates

Appendix I

Soil Sample Descriptions

SOIL SAMPLE DESCRIPTIONS, MAGNOLIA AND AJAX MINE SITES SI

Mine Site	Sample ID	Sample Interval	Sample Description	Soil Description
Ajax	AJAX-WP-SUS-10 (2.0)	1.5 - 2.0	Upper adit waste pile	Reddish to tan grey f-c sand, some f-c gravel, little rock shards
Ajax	AJAX-WP-SUS-09 (1.0)	0.8 - 1.0	Lower adit waste pile	Grey brown f-c sand, some f-c gravel and rock shards
Ajax	AJAX-WP-SUS-08 (1.2)	1.0 - 1.2	Lower adit waste pile	Red brown f-c sand, some f-c gravel and rock shards
Magnolia	MAGN-WP-SUS-14 (3.0)	2.5 - 3.0	Upper adit waste pile	Brown f-c sand, some f gravel and rock shards
Magnolia	MAGN-TA-SUS-18 (1.5)	1.0 - 1.5	Downhill of upper WP	Tan loamy vf-f sand, tr m-c sand, f gravel
Magnolia	MAGN-TA-SSS-15 (0.5)	0.4 - 0.5	Old crusher by lower waste pile	Grey f-c sand, some f gravel and rock shards, light grey and red staining
Magnolia	MAGN-WP-SSS-16 (0.5)	0.4 - 0.5	Lower adit waste pile	Tan f-c sand, little f-c gravel and rock shards, light grey staining, very hard
Magnolia	MAGN-PD-SSS-12 (0.3)	0.0 - 0.3	Lower settlement pond	Red brown sandy silt
Magnolia	MAGN-WP-SUS-17 (2.0)	1.5 - 2.0	Lower adit waste pile	Brown f-c sand, little f-c gravel and rock shards with iron staining on rock shard surfaces
Reference	LUCA-BG-SSS-19 (0.5)	0.4 - 0.5	Reference sample near Magnolia	Light tan loamy vf-f sand, tr m-c sand, f gravel
Reference	GRAN-BG-SSS-35 (0.5)	0.4 - 0.5	Reference sample near Granite Cr.	Tan vf sand
Reference	GRAN-BG-SSS-34 (0.5)	0.4 - 0.5	Reference sample near Granite Cr.	Orange brown vf sand
Reference	GRAN-BG-SSS-36 (0.5)	0.4 - 0.5	Reference sample near Granite Cr.	Brown loamy vf-c sand, little f gravel

Appendix J

Laboratory Analytical Reports

Arsenic Speciation (Total Metals in ug/L)
Pore Water Samples
Ajax/Magnolia Mines SI, July 2003

Site	Sample No.	Date	ARSENIC (III)	ARSENIC (V)
AJAX	ST-PWP-04	07/17/03	26.9	258
GRAN	ST-PWP-53	07/19/03	<2U	77.9
GRAN	ST-PWP-54	07/18/03	3.1	81.7
MAGN	ST-PWP-01	07/18/03	<2U	<2U
MAGN	ST-PWP-02	07/18/03	<2U	125
MAGN	ST-PWP-03	07/18/03	<2U	54.4

Total Metals (ug/L)
Surface Water Samples
Ajax/Magnolia Mines SI, July 2003

Site	Sample No.	Date	ALUMINUM	ANTIMONY	ARSENIC	ARSENIC (III)	ARSENIC (V)	BARIUM	CALCIUM	CHROMIUM, TOTAL	COBALT	COPPER	IRON	LEAD	MAGNESIUM	MANGANESE	MERCURY	NICKEL	POTASSIUM	SODIUM	THALLIUM	VANADIUM	ZINC
AJAX	AD-SFW-07	07/17/03	27.7B	<3.8U	2.6B	<2U	29.2	12.1B	105000	3B	<1.8U	<1.4U	<16.8U	1.6B	58000	215	0.11B	9.9B	3460B	5170	<2.8U	<2.2U	<5.7U
MAGN	AD-SFW-13	07/18/03	367	<4.7U	239	2.2	164	26.5B	134000	<1.4U	13B	5.3B	9530	<1.3U	69400	1740	0.33	68	4930B	6420	<2.8U	<2U	35.3
MAGN	AD-SFW-55	07/19/03	1180	<4.7U	<4.8U	<2U	<2U	52.3B	21500	<1.4U	<2U	2.4B	636	<1.3U	10500	48.9	0.13B	<2.1U	1360B	6340	3.7B	2.6B	5.4B
AJAX	PD-SFW-06	07/17/03	56.5B	<3.8U	5.4B	<2U	3.2	10.9B	107000	<0.6U	<1.8U	3B	765	<1.5U	58800	154	0.12B	6.9B	3530B	5230	<2.8U	<2.2U	11.9B
MAGN	PD-SFW-11	07/18/03	33.4B	<4.7U	9.7B	<2U	6.8	16.2B	133000	<1.4U	5.5B	<2.4U	64.3B	<1.3U	69100	905	0.14B	39.4B	4680B	5580	3.1B	<2U	11.5B
AJAX	ST-SFW-04	07/17/03	48.1B	4.2B	23.6	<2U	22.7	69.8B	40600	<0.6U	<1.8U	<1.4U	151	<1.5U	18600	12.8B	0.15B	<2U	2570B	6480	<2.8U	<2.2U	<5.7U
AJAX	ST-SFW-52	07/17/03	33.8B	<3.8U	47.3	73.2	186	33.1B	107000	<0.6U	<1.8U	<1.4U	31.1B	1.7B	56500	362	<0.1U	<2U	4520B	5450	<2.8U	<2.2U	<5.7U
GRAN	ST-SFW-53	07/19/03	93.9B	<4.7U	13.1	24.8	8.6	54.8B	15100	<1.4U	<2U	<2.4U	113	<1.3U	3470B	18.8	0.11B	<2.1U	1850B	3130B	3.1B	<2U	3.6B
GRAN	ST-SFW-54	07/17/03	54.1B	<3.8U	12.6	<2U	12.8	53.3B	16200	<0.6U	<1.8U	<1.4U	78.1B	<1.5U	4120B	15	0.14B	<2U	2530B	3490B	<2.8U	<2.2U	<5.7U
MAGN	ST-SFW-01	07/18/03	51.8B	4.4B	<2.4U	<2U	<2U	56.5B	28400	<0.6U	<1.8U	<1.4U	57.1B	<1.5U	12900	4.8B	0.11B	<2U	2320B	6570	<2.8U	2.4B	<5.7U
MAGN	ST-SFW-02	07/18/03	60B	4.9B	36.2	<2U	35	65.1B	40900	<0.6U	<1.8U	<1.4U	464	1.7B	18700	28	0.18B	<2U	2790B	6300	<2.8U	<2.2U	<5.7U
MAGN	ST-SFW-03	07/18/03	40.5B	<4.7U	29.6	<2U	22.5	73.3B	42200	<1.4U	<2U	<2.4U	266	<1.3U	19400	7.4B	0.18B	<2.1U	2410B	6200	<2.8U	<2U	4B

STL Burlington
Colchester, Vermont

Sample Data Summary Package

SDG: GCD002

SEVERN TRENT STL

September 12, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCD002

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 22 and 24, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94941		
535363	AJAXSTPSD04	07/17/03	Sediment
535364	AJAXPDSSD06	07/17/03	Sediment
535365	AJAXSTRSD04	07/17/03	Sediment
535366	AJAXSTSSD52	07/17/03	Sediment
535367	GRANSTRSD54	07/17/03	Sediment
535368	GRANSTPSD54	07/17/03	Sediment
535369	MAGNSTPSD03	07/18/03	Sediment
535370	MAGNPDSSD11	07/18/03	Sediment
535371	MAGNSTPSD02	07/18/03	Sediment
535372	MAGNSTPSD01	07/18/03	Sediment
535373	GRANSTPSD53	07/19/03	Sediment
535373MS	GRANSTPSD53MS	07/19/03	Sediment
535373DP	GRANSTPSD53REP	07/19/03	Sediment
535374	GRANSTRSD53	07/19/03	Sediment
	Received: 07/24/03 ETR No: 95000		
535813	BLUESTPSD05	07/21/03	Sediment
535814	BLUESTPSD05100	07/21/03	Sediment
535815	BLUESTPSD06	07/21/03	Sediment
535816	BLUESTRSD08	07/20/03	Sediment
535817	BLUESTPSD08	07/20/03	Sediment
535818	BLUESTPSD07	07/20/03	Sediment

0001-A

One of the sample containers for the sample designated BLUESTPSD08 was received broken.

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample login is included in the Sample Handling section of this submittal.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Metals by 6010B:
The sample designated AJAXPDSSD06 yielded a negative interference for thallium. This sample was analyzed full strength (-302.9) and at a 1:10 dilution (61.4). Both sets of results yielded a negative interference for thallium. The laboratory suspects that this anomaly is likely due to the elevated presence of manganese present in the sample. The results have been reported from a 1:10 dilution.

The serial dilution of the sample designated GRANSTRSD53 yielded a percent recovery marginally below the established control limits. Additionally, the duplicate analysis of this sample yielded %RSDs for several elements outside of the established control limits.

Total Organic Carbon by Lloyd Kahn:
The duplicate analysis of the sample designated GRANSTRSD53 yielded a %RPD of 22%.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0696.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The Laboratory Director or his designee, as verified by the following signature, has authorized the release of the data contained in this hardcopy data package.

Sincerely,

Chris Anderson, for:

Michael F. Wheeler, Ph.D.
Laboratory Director

0001-B Last Alpha

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Sediment

p 1 of 2

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: Same
Address: 12011 Bel-Red Road Bellevue, WA 98	Address:
Contact: Jen Kindred	Contact:
Phone: 425-451-7400	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Sampler's Name: James Gaithers

Sampler's Signature:

Proj. No.: 13890.13

Project Name: Granite Creek Watershed Mines

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TOC	TAL Metals	CN	Grain Size	Lab/Sample ID (Lab Use Only)
SD	7/17/03	1525		X	AJAX-ST-PSD-04			2		X	X	X	X	
SD	7/17/03	1430		X	AJAX-PD-SSD-06			2		X	X	X	X	
SD	7/17/03	1521		X	AJAX-ST-RSD-04			2		X	X	X	X	
SD	7/17/03	1520		X	AJAX-ST-SSD-52			2		X	X	X	X	
SD	7/17/03	1835		X	GRAN-ST-PSD-53			2		X	X	X	X	
SD	7/17/03	1845		X	GRAN-ST-RSD-53			2		X	X	X	X	
SD	7/17/03	1745		X	GRAN-ST-RSD-54			2		X	X	X	X	
SD	7/17/03	1750		X	GRAN-ST-PSD-54			2		X	X	X	X	
SD	7/18/03	1710		X	MAGN-ST-~~RSD~~PSD-03			2		X	X	X	X	
SD	7/18/03	1510		X	MAGN-PD-~~5~~PSD-11			2		X	X	X	X	

Lab Use Only
Due Date:

Temp. of coolers when received (C°):

1	2	3	4	5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
	7-21-03	0800		7/22/03	1030
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil

[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

Sediment p2 of 2

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200
Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7806
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Jen Kindred / Don Norman
Sampler's Signature: Don Norman

Proj. No.: 13890, 13
Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TOC	TAL Metals	CN	Grain Size	Lab/Sample ID (Lab Use Only)
SD	7/18/03	1600		X	MAGN-ST-PSD-02			2		X	X	X	X	
SD	7/18/03	1540		X	MAGN-ST-PSD-01			2		X	X	X	X	
SD	7/19/03	1500		X	GRAN-ST-PSD-53 MS			3		X	X	X	X	MS on TOC, TAL, CN
SD	7/19/03	1445		X	GRAN-ST-RSD-53			2		X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
[signature]	7-21-03	0900	[signature]	7/22/03	1030
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

SD = Sediment

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**
SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Sediment 10 of

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200 Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°):
1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Don Norman
Sampler's Signature: Don Norman

Proj. No.: 13890.16
Project Name: Granite Cr Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TOC	CN	TAL metals	Grain size	Lab/Sample ID (Lab Use Only)
SD	7/21/03	1145		X	BLUE-ST-PSD-05			2		X	X	X	X	
SD	7/21/03	1145		X	BLUE-ST-PSD-05 (100)			2		X	X	X	X	
SD	7/21/03	1200		X	BLUE-ST-PSD-06			2		X	X	X	X	
SD	7/20/03	1615		X	BLUE-ST-RSD-08			2		X	X	X	X	
SD	7/20/03	1630		X	BLUE-ST-PSD-08			2		X	X	X	X	
SD	7/20/03	1830		X	BLUE-ST-PSD-07			2		X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
[signature]	7/22/03	0900	[signature]	7/24/03	0930
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXSTPSD04

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535363

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 78.8

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		78.8	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	127	3840	

Printed on: 09/11/03 02:57 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXPDSSD06

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535364

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/22/03

% Solids: 30.8

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		30.8	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	325	17200	

Printed on: 09/11/03 02:57 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXSTRSD04

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535365

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 78.3

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		78.3	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	128	15500	

Printed on: 09/11/03 02:58 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXSTSSD52

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535366

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/22/03

% Solids: 11.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		11.5	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	870	119900	

Printed on: 09/11/03 02:58 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTRSD54

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535367

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 83.3

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		83.3	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	121	121	U

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTPSD54

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535368

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 70.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		70.1	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	143	27700	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNSTPSD03

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535369

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 80.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		80.6	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	125	6040	

Printed on: 09/11/03 03:00 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNPDSSD11

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD002

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 535370

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/22/03

% Solids: 13.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		13.6	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	736	11200	

Printed on: 09/11/03 03:00 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNSTPSD02

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535371

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 67.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		67.0	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	150	12400	

Printed on: 09/11/03 03:01 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNSTPSD01

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535372

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 75.8

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		75.8	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	132	5130	

Printed on: 09/11/03 03:02 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTPSD53

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535373

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 78.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		78.6	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	128	2670	

Printed on: 09/11/03 03:04 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTRSD53

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535374

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 80.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		80.4	
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	1	125	6750	

Printed on: 09/11/03 03:06 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTPSD05

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535813

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/24/03

% Solids: 82.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		82.2	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	122	3530	

Printed on: 09/11/03 03:07 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTPSD05100

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535814

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/24/03

% Solids: 74.7

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		74.7	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	134	4760	

Printed on: 09/11/03 03:08 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTPSD06

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535815

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/24/03

% Solids: 80.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		80.9	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	124	124	U

Printed on: 09/11/03 03:08 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTRSD08

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535816

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/24/03

% Solids: 84.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		84.0	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	120	26400	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTPSD08

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535817

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/24/03

% Solids: 80.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		80.4	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	125	7820	

Printed on: 09/11/03 03:09 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUESTPSD07

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535818

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/24/03

% Solids: 70.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		70.2	
IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	1	143	22400	

Printed on: 09/11/03 03:10 PM

WET CHEMISTRY

Method Blank Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCD002

Lab Code: STLVT **Case No.:** 23046

Matrix: SOIL **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Conc.	Units	Qual.	DF	RL	Analytical Run Date	Analytical Batch
BLKLK0728A	IN847	TOC by Lloyd Kahn	100	mg/Kg	U	1	100	07/28/03	BLKLK0728A
BLKLK0730A	IN847	TOC by Lloyd Kahn	100	mg/Kg	U	1	100	07/30/03	BLKLK0730A

Printed on: 09/11/03 03:11 PM

WET CHEMISTRY

Matrix Spike Sample Report Summary

Client Sample No.
GRANSTPSD53MS

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535373MS

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Matrix Spike Result Conc.	Qual.	Sample Result Conc.	Qual.	Spike Added	% Recovery*
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	125800		2670		110501.00	111.4

* *Control Limit for Percent Recovery is 75-125%, unless otherwise specified.*

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WET CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.
GRANSTPSD53REP

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535373DP

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/22/03

% Solids: 81.7

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Qual.	Duplicate Sample Result Conc.	Qual.	RPD*
IN623	Solids, Percent	07/29/03	N/A	%	78.6		81.7		4
IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	2670		2140		22

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/11/03 03:03 PM

WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCD002

Lab Code: STLVT **Case No.:** 23046

Matrix: SOIL **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCSLK0728A	IN847	TOC by Lloyd Kahn	07/28/03	BLKLK0728A	mg/Kg	8360	8500.0000	98.4
LCSLK0730A	IN847	TOC by Lloyd Kahn	07/30/03	BLKLK0730A	mg/Kg	8510	8500.0000	100.1

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

Printed on: 09/11/03 03:11 PM

SEVERN TRENT STL

Sample Data Summary Package For Metals

USEPA - CLP

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
AJAXPDSSD06	535364
AJAXSTPSD04	535363
AJAXSTRSD04	535365
AJAXSTSSD52	535366
BLUESTPSD05	535813
BLUESTPSD05100	535814
BLUESTPSD06	535815
BLUESTPSD07	535818
BLUESTPSD08	535817
BLUESTRSD08	535816
GRANSTPSD53	535373
GRANSTPSD53D	535373DP
GRANSTPSD53S	535373MS
GRANSTPSD54	535368
GRANSTRSD53	535374
GRANSTRSD54	535367
MAGNPDSSD11	535370
MAGNSTPSD01	535372
MAGNSTPSD02	535371
MAGNSTPSD03	535369

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXPDSSD06

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535364

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 30.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	5190		*	P
7440-36-0	Antimony	5.2	B	N	P
7440-38-2	Arsenic	1020			P
7440-39-3	Barium	309		*	P
7440-41-7	Beryllium	1.5			P
7440-43-9	Cadmium	9.3			P
7440-70-2	Calcium	33300		*	P
7440-47-3	Chromium	4.4		*	P
7440-48-4	Cobalt	254			P
7440-50-8	Copper	316		*	P
7439-89-6	Iron	319000		*	P
7439-92-1	Lead	27.9		*	P
7439-95-4	Magnesium	3530		*	P
7439-96-5	Manganese	40600			P
7439-97-6	Mercury	0.76		*	CV
7440-02-0	Nickel	860			P
7440-09-7	Potassium	892	B	E*	P
7782-49-2	Selenium	11.6			P
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	129	U		P
7440-28-0	Thallium	15.6	U		P
7440-62-2	Vanadium	17.8		*	P
7440-66-6	Zinc	1660		*	P
57-12-5	Cyanide	2.9			AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTPSD04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535363

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 78.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10300		*	P
7440-36-0	Antimony	3.4	B	N	P
7440-38-2	Arsenic	326			P
7440-39-3	Barium	233		*	P
7440-41-7	Beryllium	0.71			P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	7350		*	P
7440-47-3	Chromium	19.5		*	P
7440-48-4	Cobalt	18.1			P
7440-50-8	Copper	80.4		*	P
7439-89-6	Iron	36500		*	P
7439-92-1	Lead	69.4		*	P
7439-95-4	Magnesium	5360		*	P
7439-96-5	Manganese	2570			P
7439-97-6	Mercury	0.51		*	CV
7440-02-0	Nickel	43.8			P
7440-09-7	Potassium	2560		E*	P
7782-49-2	Selenium	1.3			P
7440-22-4	Silver	2.2			P
7440-23-5	Sodium	287	B		P
7440-28-0	Thallium	0.65	U		P
7440-62-2	Vanadium	39.4		*	P
7440-66-6	Zinc	180		*	P
57-12-5	Cyanide	0.48	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTRSD04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535365

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 78.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9950		*	P
7440-36-0	Antimony	1.5	B	N	P
7440-38-2	Arsenic	631			P
7440-39-3	Barium	263		*	P
7440-41-7	Beryllium	0.76			P
7440-43-9	Cadmium	0.58			P
7440-70-2	Calcium	13800		*	P
7440-47-3	Chromium	18.5		*	P
7440-48-4	Cobalt	18.0			P
7440-50-8	Copper	36.9		*	P
7439-89-6	Iron	44500		*	P
7439-92-1	Lead	26.3		*	P
7439-95-4	Magnesium	8630		*	P
7439-96-5	Manganese	2600			P
7439-97-6	Mercury	0.42		*	CV
7440-02-0	Nickel	29.6			P
7440-09-7	Potassium	2830		E*	P
7782-49-2	Selenium	0.85			P
7440-22-4	Silver	1.3			P
7440-23-5	Sodium	132	B		P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	50.0		*	P
7440-66-6	Zinc	120		*	P
57-12-5	Cyanide	0.59	U		AS

Color Before: brown Clarity Before: _____ Texture: medium

Color After: yellow Clarity After: clear Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTSSD52

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535366

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 11.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16800		*	P
7440-36-0	Antimony	12.2	B	N	P
7440-38-2	Arsenic	2800			P
7440-39-3	Barium	268		*	P
7440-41-7	Beryllium	0.96	B		P
7440-43-9	Cadmium	5.3			P
7440-70-2	Calcium	16500		*	P
7440-47-3	Chromium	21.0		*	P
7440-48-4	Cobalt	28.3	B		P
7440-50-8	Copper	105		*	P
7439-89-6	Iron	134000		*	P
7439-92-1	Lead	42.5		*	P
7439-95-4	Magnesium	5490		*	P
7439-96-5	Manganese	3480			P
7439-97-6	Mercury	1.0		*	CV
7440-02-0	Nickel	161			P
7440-09-7	Potassium	3250	B	E*	P
7782-49-2	Selenium	6.9			P
7440-22-4	Silver	2.6	B		P
7440-23-5	Sodium	599	B		P
7440-28-0	Thallium	4.0	U		P
7440-62-2	Vanadium	57.3		*	P
7440-66-6	Zinc	705		*	P
57-12-5	Cyanide	4.0	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUESTPSD05

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535813

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 82.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14900			P
7440-36-0	Antimony	1.2	B	N	P
7440-38-2	Arsenic	19.4			P
7440-39-3	Barium	73.1		*	P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	0.059	U		P
7440-70-2	Calcium	4180		*	P
7440-47-3	Chromium	86.1		*	P
7440-48-4	Cobalt	20.7			P
7440-50-8	Copper	28.8		*	P
7439-89-6	Iron	28100		*	P
7439-92-1	Lead	3.6		*	P
7439-95-4	Magnesium	11500		*	P
7439-96-5	Manganese	665			P
7439-97-6	Mercury	0.38		*	CV
7440-02-0	Nickel	111			P
7440-09-7	Potassium	808		E*	P
7782-49-2	Selenium	0.52			P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	226	B		P
7440-28-0	Thallium	0.93	B		P
7440-62-2	Vanadium	52.2		*	P
7440-66-6	Zinc	56.2			P
57-12-5	Cyanide	0.52	U		AS

Color Before: brown Clarity Before: Texture: coarse

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLUESTPSD05100

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535814

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 74.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14200			P
7440-36-0	Antimony	1.2	B	N	P
7440-38-2	Arsenic	22.7			P
7440-39-3	Barium	73.4		*	P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	0.059	U		P
7440-70-2	Calcium	2710		*	P
7440-47-3	Chromium	101		*	P
7440-48-4	Cobalt	15.9			P
7440-50-8	Copper	36.5		*	P
7439-89-6	Iron	28500		*	P
7439-92-1	Lead	4.9		*	P
7439-95-4	Magnesium	11200		*	P
7439-96-5	Manganese	531			P
7439-97-6	Mercury	0.13		*	CV
7440-02-0	Nickel	107			P
7440-09-7	Potassium	949		E*	P
7782-49-2	Selenium	0.49			P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	254	B		P
7440-28-0	Thallium	0.84	B		P
7440-62-2	Vanadium	49.3		*	P
7440-66-6	Zinc	62.4			P
57-12-5	Cyanide	0.50	U		AS

Color Before: brown Clarity Before: _____ Texture: coarse

Color After: yellow Clarity After: clear Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUESTPSD06

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535815

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 80.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7730			P
7440-36-0	Antimony	0.52	U	N	P
7440-38-2	Arsenic	7.4			P
7440-39-3	Barium	71.5		*	P
7440-41-7	Beryllium	0.19	B		P
7440-43-9	Cadmium	0.077	B		P
7440-70-2	Calcium	2980		*	P
7440-47-3	Chromium	20.4		*	P
7440-48-4	Cobalt	14.9			P
7440-50-8	Copper	40.6		*	P
7439-89-6	Iron	10000		*	P
7439-92-1	Lead	2.0		*	P
7439-95-4	Magnesium	2690		*	P
7439-96-5	Manganese	786			P
7439-97-6	Mercury	0.075		*	CV
7440-02-0	Nickel	92.0			P
7440-09-7	Potassium	350	B	E*	P
7782-49-2	Selenium	0.44	B		P
7440-22-4	Silver	0.24	U		P
7440-23-5	Sodium	337	B		P
7440-28-0	Thallium	0.63	U		P
7440-62-2	Vanadium	16.4		*	P
7440-66-6	Zinc	28.8			P
57-12-5	Cyanide	0.61	U		AS

Color Before: brown Clarity Before: Texture: coarse

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUESTPSD07

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535818

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 70.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11800			P
7440-36-0	Antimony	1.0	B	N	P
7440-38-2	Arsenic	31.0			P
7440-39-3	Barium	82.3		*	P
7440-41-7	Beryllium	0.32	B		P
7440-43-9	Cadmium	0.12	B		P
7440-70-2	Calcium	3350		*	P
7440-47-3	Chromium	55.6		*	P
7440-48-4	Cobalt	14.6			P
7440-50-8	Copper	26.8		*	P
7439-89-6	Iron	20000		*	P
7439-92-1	Lead	3.1		*	P
7439-95-4	Magnesium	6500		*	P
7439-96-5	Manganese	571			P
7439-97-6	Mercury	0.10		*	CV
7440-02-0	Nickel	82.7			P
7440-09-7	Potassium	1310		E*	P
7782-49-2	Selenium	0.69			P
7440-22-4	Silver	0.33	B		P
7440-23-5	Sodium	364	B		P
7440-28-0	Thallium	0.62	U		P
7440-62-2	Vanadium	35.1		*	P
7440-66-6	Zinc	56.6			P
57-12-5	Cyanide	0.69	U		AS

Color Before: brown Clarity Before: Texture: coarse

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUESTPSD08

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535817

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 80.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4750			P
7440-36-0	Antimony	0.96	B	N	P
7440-38-2	Arsenic	15.3			P
7440-39-3	Barium	60.6		*	P
7440-41-7	Beryllium	0.39	B		P
7440-43-9	Cadmium	0.060	U		P
7440-70-2	Calcium	1070		*	P
7440-47-3	Chromium	78.0		*	P
7440-48-4	Cobalt	24.9			P
7440-50-8	Copper	51.3		*	P
7439-89-6	Iron	57900		*	P
7439-92-1	Lead	5.4		*	P
7439-95-4	Magnesium	11100		*	P
7439-96-5	Manganese	733			P
7439-97-6	Mercury	0.085		*	CV
7440-02-0	Nickel	160			P
7440-09-7	Potassium	530		E*	P
7782-49-2	Selenium	1.0			P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	62.3	B		P
7440-28-0	Thallium	2.2			P
7440-62-2	Vanadium	57.1		*	P
7440-66-6	Zinc	56.6			P
57-12-5	Cyanide	0.56	U		AS

Color Before: brown Clarity Before: Texture: coarse

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUESTRSD08

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535816

Level (low/med): LOW Date Received: 7/24/2003

% Solids: 84.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12600			P
7440-36-0	Antimony	0.47	U	N	P
7440-38-2	Arsenic	3.9			P
7440-39-3	Barium	64.2		*	P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.060	U		P
7440-70-2	Calcium	5890		*	P
7440-47-3	Chromium	10.7		*	P
7440-48-4	Cobalt	9.5			P
7440-50-8	Copper	54.1		*	P
7439-89-6	Iron	14000		*	P
7439-92-1	Lead	1.3		*	P
7439-95-4	Magnesium	4610		*	P
7439-96-5	Manganese	527			P
7439-97-6	Mercury	0.056		*	CV
7440-02-0	Nickel	51.9			P
7440-09-7	Potassium	1110		E*	P
7782-49-2	Selenium	0.17	U		P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	1040			P
7440-28-0	Thallium	0.58	U		P
7440-62-2	Vanadium	10.6		*	P
7440-66-6	Zinc	59.1			P
57-12-5	Cyanide	0.56	U		AS

Color Before: brown Clarity Before: Texture: coarse

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPSD53

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535373

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 78.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10200		*	P
7440-36-0	Antimony	2.0	B	N	P
7440-38-2	Arsenic	130			P
7440-39-3	Barium	139		*	P
7440-41-7	Beryllium	0.24	B		P
7440-43-9	Cadmium	0.96			P
7440-70-2	Calcium	2180		*	P
7440-47-3	Chromium	10.4		*	P
7440-48-4	Cobalt	6.9			P
7440-50-8	Copper	18.1		*	P
7439-89-6	Iron	21600		*	P
7439-92-1	Lead	38.2		*	P
7439-95-4	Magnesium	4790		*	P
7439-96-5	Manganese	364			P
7439-97-6	Mercury	0.11		*	CV
7440-02-0	Nickel	6.2			P
7440-09-7	Potassium	2840		E*	P
7782-49-2	Selenium	0.44	B		P
7440-22-4	Silver	1.8			P
7440-23-5	Sodium	45.2	U		P
7440-28-0	Thallium	0.69	B		P
7440-62-2	Vanadium	52.1		*	P
7440-66-6	Zinc	150		*	P
57-12-5	Cyanide	0.57	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPSD54

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535368

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 70.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	8910		*	P
7440-36-0	Antimony	5.1	B	N	P
7440-38-2	Arsenic	303			P
7440-39-3	Barium	144		*	P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	2.8			P
7440-70-2	Calcium	2740		*	P
7440-47-3	Chromium	10.9		*	P
7440-48-4	Cobalt	6.5			P
7440-50-8	Copper	28.0		*	P
7439-89-6	Iron	18900		*	P
7439-92-1	Lead	148		*	P
7439-95-4	Magnesium	3460		*	P
7439-96-5	Manganese	611			P
7439-97-6	Mercury	0.32		*	CV
7440-02-0	Nickel	7.6			P
7440-09-7	Potassium	2400		E*	P
7782-49-2	Selenium	0.80			P
7440-22-4	Silver	7.9			P
7440-23-5	Sodium	70.2	B		P
7440-28-0	Thallium	0.67	U		P
7440-62-2	Vanadium	43.0		*	P
7440-66-6	Zinc	186		*	P
57-12-5	Cyanide	0.59	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTRSD53

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535374

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 80.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	9670		*	P
7440-36-0	Antimony	2.3	B	N	P
7440-38-2	Arsenic	126			P
7440-39-3	Barium	127		*	P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	1.2			P
7440-70-2	Calcium	2230		*	P
7440-47-3	Chromium	9.9		*	P
7440-48-4	Cobalt	6.2			P
7440-50-8	Copper	18.6		*	P
7439-89-6	Iron	19000		*	P
7439-92-1	Lead	44.3		*	P
7439-95-4	Magnesium	4030		*	P
7439-96-5	Manganese	360			P
7439-97-6	Mercury	0.12		*	CV
7440-02-0	Nickel	6.5			P
7440-09-7	Potassium	2550		E*	P
7782-49-2	Selenium	0.42	B		P
7440-22-4	Silver	4.9			P
7440-23-5	Sodium	45.9	U		P
7440-28-0	Thallium	0.73	B		P
7440-62-2	Vanadium	45.9		*	P
7440-66-6	Zinc	148		*	P
57-12-5	Cyanide	0.60	U		AS

Color Before: brown Clarity Before: _____ Texture: medium

Color After: yellow Clarity After: clear Artifacts: _____

Comments: _____

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-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANSTRSD54

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535367

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 83.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7770		*	P
7440-36-0	Antimony	5.1	B	N	P
7440-38-2	Arsenic	246			P
7440-39-3	Barium	126		*	P
7440-41-7	Beryllium	0.21	B		P
7440-43-9	Cadmium	1.8			P
7440-70-2	Calcium	1750		*	P
7440-47-3	Chromium	8.3		*	P
7440-48-4	Cobalt	6.4			P
7440-50-8	Copper	30.0		*	P
7439-89-6	Iron	18300		*	P
7439-92-1	Lead	121		*	P
7439-95-4	Magnesium	3380		*	P
7439-96-5	Manganese	560			P
7439-97-6	Mercury	0.12		*	CV
7440-02-0	Nickel	7.3			P
7440-09-7	Potassium	2340		E*	P
7782-49-2	Selenium	0.63			P
7440-22-4	Silver	6.3			P
7440-23-5	Sodium	79.5	B		P
7440-28-0	Thallium	0.76	B		P
7440-62-2	Vanadium	38.3		*	P
7440-66-6	Zinc	151		*	P
57-12-5	Cyanide	0.57	U		AS

Color Before: brown Clarity Before: _____ Texture: medium

Color After: yellow Clarity After: clear Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNPDSSD11

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535370

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 13.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	46500		*	P
7440-36-0	Antimony	6.5	B	N	P
7440-38-2	Arsenic	2190			P
7440-39-3	Barium	200		*	P
7440-41-7	Beryllium	3.8			P
7440-43-9	Cadmium	3.6			P
7440-70-2	Calcium	11000		*	P
7440-47-3	Chromium	54.9		*	P
7440-48-4	Cobalt	54.9			P
7440-50-8	Copper	461		*	P
7439-89-6	Iron	136000		*	P
7439-92-1	Lead	23.2		*	P
7439-95-4	Magnesium	7110		*	P
7439-96-5	Manganese	2750			P
7439-97-6	Mercury	1.2		*	CV
7440-02-0	Nickel	159			P
7440-09-7	Potassium	5430		E*	P
7782-49-2	Selenium	2.6	B		P
7440-22-4	Silver	2.3	B		P
7440-23-5	Sodium	263	U		P
7440-28-0	Thallium	5.5	B		P
7440-62-2	Vanadium	90.2		*	P
7440-66-6	Zinc	515		*	P
57-12-5	Cyanide	3.3	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNSTPSD01

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535372

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 75.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14900		*	P
7440-36-0	Antimony	0.46	U	N	P
7440-38-2	Arsenic	1.3			P
7440-39-3	Barium	502		*	P
7440-41-7	Beryllium	0.44	B		P
7440-43-9	Cadmium	0.059	U		P
7440-70-2	Calcium	5500		*	P
7440-47-3	Chromium	14.9		*	P
7440-48-4	Cobalt	9.6			P
7440-50-8	Copper	14.3		*	P
7439-89-6	Iron	20700		*	P
7439-92-1	Lead	3.8		*	P
7439-95-4	Magnesium	3910		*	P
7439-96-5	Manganese	424			P
7439-97-6	Mercury	0.020	B	*	CV
7440-02-0	Nickel	24.3			P
7440-09-7	Potassium	394	B	E*	P
7782-49-2	Selenium	0.48	B		P
7440-22-4	Silver	0.21	U		P
7440-23-5	Sodium	764			P
7440-28-0	Thallium	0.56	U		P
7440-62-2	Vanadium	34.2		*	P
7440-66-6	Zinc	21.8		*	P
57-12-5	Cyanide	0.64	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPSD02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535371

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 67.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1550		*	P
7440-36-0	Antimony	2.6	B	N	P
7440-38-2	Arsenic	121			P
7440-39-3	Barium	40.2		*	P
7440-41-7	Beryllium	0.65			P
7440-43-9	Cadmium	0.16	B		P
7440-70-2	Calcium	923		*	P
7440-47-3	Chromium	51.7		*	P
7440-48-4	Cobalt	3.1	B		P
7440-50-8	Copper	36.1		*	P
7439-89-6	Iron	23200		*	P
7439-92-1	Lead	4.6		*	P
7439-95-4	Magnesium	1010		*	P
7439-96-5	Manganese	319			P
7439-97-6	Mercury	1.4		*	CV
7440-02-0	Nickel	6.6			P
7440-09-7	Potassium	848		E*	P
7782-49-2	Selenium	0.45	B		P
7440-22-4	Silver	3.6			P
7440-23-5	Sodium	74.8	B		P
7440-28-0	Thallium	0.99	B		P
7440-62-2	Vanadium	62.2		*	P
7440-66-6	Zinc	50.3		*	P
57-12-5	Cyanide	0.70	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPSD03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Lab Sample ID: 535369

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 80.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4750		*	P
7440-36-0	Antimony	5.1	B	N	P
7440-38-2	Arsenic	742			P
7440-39-3	Barium	188		*	P
7440-41-7	Beryllium	0.42	B		P
7440-43-9	Cadmium	0.74			P
7440-70-2	Calcium	2000		*	P
7440-47-3	Chromium	11.6		*	P
7440-48-4	Cobalt	59.5			P
7440-50-8	Copper	32.8		*	P
7439-89-6	Iron	42100		*	P
7439-92-1	Lead	54.1		*	P
7439-95-4	Magnesium	1060		*	P
7439-96-5	Manganese	1920			P
7439-97-6	Mercury	1.1		*	CV
7440-02-0	Nickel	131			P
7440-09-7	Potassium	1300		E*	P
7782-49-2	Selenium	1.6			P
7440-22-4	Silver	1.2			P
7440-23-5	Sodium	65.3	B		P
7440-28-0	Thallium	0.84	B		P
7440-62-2	Vanadium	29.4		*	P
7440-66-6	Zinc	140		*	P
57-12-5	Cyanide	0.55	U		AS

Color Before: brown Clarity Before: _____ Texture: medium

Color After: yellow Clarity After: clear Artifacts: _____

Comments: _____

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Cyanide	120.0	113.99	95.0	150.0	144.40	96.3	149.38	99.6	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Cyanide				150.0	153.09	102.1	151.26	100.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury	3.0	2.82	94.0	5.0	4.90	98.0	4.71	94.2	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury				5.0	4.61	92.2	5.15	103.0	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Mercury	3.0	2.72	90.7	5.0	4.85	97.0	4.46	89.2	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	998.00	99.8	400.0	405.60	101.4	408.40	102.1	P
Selenium	250.0	243.60	97.4	100.0	102.30	102.3	101.70	101.7	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Lead				400.0	410.80	102.7	406.20	101.6	P
Selenium				100.0	102.50	102.5	101.80	101.8	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26240.00	100.9	30200.0	29780.00	98.6	30030.00	99.4	P
Antimony	250.0	245.80	98.3	300.0	296.90	99.0	293.40	97.8	P
Arsenic	250.0	246.80	98.7	100.0	97.74	97.7	99.90	99.9	P
Barium	500.0	492.40	98.5	200.0	195.90	98.0	197.50	98.8	P
Beryllium	500.0	495.00	99.0	100.0	97.16	97.2	97.22	97.2	P
Cadmium	500.0	486.00	97.2	100.0	96.41	96.4	96.04	96.0	P
Calcium	25000.0	25340.00	101.4	30200.0	29970.00	99.2	29790.00	98.6	P
Chromium	500.0	492.60	98.5	200.0	191.50	95.8	192.20	96.1	P
Cobalt	500.0	487.10	97.4	200.0	194.40	97.2	194.20	97.1	P
Copper	500.0	497.50	99.5	200.0	197.90	99.0	198.00	99.0	P
Iron	25500.0	26090.00	102.3	30200.0	29840.00	98.8	29960.00	99.2	P
Lead	1000.0	983.60	98.4	400.0	387.70	96.9	387.00	96.8	P
Magnesium	25000.0	25190.00	100.8	30200.0	29640.00	98.1	29510.00	97.7	P
Manganese	500.0	488.40	97.7	200.0	194.20	97.1	193.40	96.7	P
Nickel	500.0	490.40	98.1	200.0	193.80	96.9	193.60	96.8	P
Potassium	25000.0	26530.00	106.1	30200.0	30820.00	102.1	31040.00	102.8	P
Silver	500.0	496.40	99.3	100.0	98.14	98.1	99.89	99.9	P
Sodium	25000.0	25230.00	100.9	30200.0	28980.00	96.0	29570.00	97.9	P
Thallium	250.0	237.90	95.2	100.0	97.51	97.5	98.66	98.7	P
Vanadium	500.0	490.80	98.2	200.0	196.30	98.2	195.70	97.8	P
Zinc	500.0	494.00	98.8	200.0	196.40	98.2	195.90	98.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29900.00	99.0	29890.00	99.0	P
Antimony				300.0	294.20	98.1	295.00	98.3	P
Arsenic				100.0	99.42	99.4	98.17	98.2	P
Barium				200.0	196.10	98.0	196.20	98.1	P
Beryllium				100.0	97.65	97.6	96.94	96.9	P
Cadmium				100.0	96.42	96.4	96.02	96.0	P
Calcium				30200.0	29820.00	98.7	29690.00	98.3	P
Chromium				200.0	191.50	95.8	191.10	95.6	P
Cobalt				200.0	194.10	97.0	193.50	96.8	P
Copper				200.0	197.80	98.9	197.10	98.6	P
Iron				30200.0	29950.00	99.2	29890.00	99.0	P
Lead				400.0	384.70	96.2	388.00	97.0	P
Magnesium				30200.0	29630.00	98.1	29460.00	97.5	P
Manganese				200.0	192.70	96.4	192.20	96.1	P
Nickel				200.0	194.20	97.1	193.20	96.6	P
Potassium				30200.0	30980.00	102.6	31020.00	102.7	P
Silver				100.0	100.20	100.2	98.84	98.8	P
Sodium				30200.0	29470.00	97.6	29370.00	97.3	P
Thallium				100.0	98.29	98.3	94.41	94.4	P
Vanadium				200.0	195.90	98.0	195.00	97.5	P
Zinc				200.0	197.40	98.7	196.00	98.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	30000.00	99.3			P
Antimony				300.0	294.50	98.2			P
Arsenic				100.0	96.36	96.4			P
Barium				200.0	197.10	98.6			P
Beryllium				100.0	96.41	96.4			P
Cadmium				100.0	95.62	95.6			P
Calcium				30200.0	29750.00	98.5			P
Chromium				200.0	190.80	95.4			P
Cobalt				200.0	193.00	96.5			P
Copper				200.0	198.40	99.2			P
Iron				30200.0	29790.00	98.6			P
Lead				400.0	382.80	95.7			P
Magnesium				30200.0	29340.00	97.2			P
Manganese				200.0	191.80	95.9			P
Nickel				200.0	191.30	95.6			P
Potassium				30200.0	31180.00	103.2			P
Silver				100.0	98.79	98.8			P
Sodium				30200.0	29310.00	97.1			P
Thallium				100.0	101.00	101.0			P
Vanadium				200.0	194.10	97.0			P
Zinc				200.0	195.90	98.0			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Cyanide	120.0	118.54	98.8	150.0	146.46	97.6	149.40	99.6	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Cyanide				150.0	149.12	99.4	148.07	98.7	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Manganese	500.0	494.80	99.0	200.0	199.00	99.5	201.00	100.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Manganese				200.0	203.40	101.7	199.00	99.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Cyanide	120.0	116.78	97.3	150.0	139.64	93.1	142.74	95.2	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Cyanide				150.0	144.46	96.3	143.71	95.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Cyanide	120.0	117.46	97.9	150.0	140.94	94.0	143.67	95.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Cyanide				150.0	142.40	94.9			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Mercury	0.2	0.22	110.0					

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Found	%R	Final Found	%R
Mercury	0.2	0.14	70.0					

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Lead				6.0	8.44	140.7	8.17	136.2
Selenium				10.0	9.26	92.6	11.19	111.9

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	469.90	117.5	474.00	118.5
Antimony				120.0	118.70	98.9	118.90	99.1
Arsenic				20.0	20.54	102.7	19.30	96.5
Barium				400.0	389.80	97.4	391.20	97.8
Beryllium				10.0	10.01	100.1	10.09	100.9
Cadmium				10.0	9.75	97.5	9.91	99.1
Calcium				10000.0	10240.00	102.4	10290.00	102.9
Chromium				20.0	19.20	96.0	20.27	101.4
Cobalt				100.0	95.72	95.7	95.66	95.7
Copper				50.0	50.07	100.1	51.23	102.5
Iron				200.0	244.90	122.4	251.60	125.8
Lead				6.0	4.17	69.5	4.32	72.0
Magnesium				10000.0	9945.00	99.4	9977.00	99.8
Manganese				30.0	29.09	97.0	28.93	96.4
Nickel				80.0	79.51	99.4	80.56	100.7
Potassium				10000.0	10760.00	107.6	10900.00	109.0
Silver				20.0	19.93	99.6	20.50	102.5
Sodium				10000.0	9714.00	97.1	9875.00	98.8
Thallium				20.0	20.53	102.6	22.91	114.6
Vanadium				100.0	96.82	96.8	96.83	96.8
Zinc				40.0	39.43	98.6	39.67	99.2

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Manganese				30.0	29.92	99.7	29.81	99.4

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide			10.0	U							AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury			0.1	B							CV

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury	0.1	U	0.1	U	0.1	U			0.017	U	CV

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									2.360	U	P
Antimony									0.470	U	P
Arsenic									0.480	U	P
Barium									0.590	U	P
Beryllium									0.020	U	P
Cadmium									0.060	U	P
Calcium									18.210	U	P
Chromium									-0.211	B	P
Cobalt									0.200	U	P
Copper									0.240	U	P
Iron									3.464	B	P
Lead	1.5	U	2.9	B	1.5	U	2.3	B	0.196	B	P
Magnesium									17.830	U	P
Manganese									0.070	U	P
Nickel									-0.315	B	P
Potassium									39.300	U	P
Selenium	1.7	U	1.7	U	1.7	U	1.7	U	0.211	B	P
Silver									0.220	U	P
Sodium									88.450	B	P
Thallium									0.570	U	P
Vanadium									0.200	U	P
Zinc									0.104	B	P

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									2.360	U	P
Antimony									0.470	U	P
Arsenic									0.480	U	P
Barium									0.590	U	P
Beryllium									0.020	U	P
Cadmium									0.060	U	P
Calcium									18.210	U	P
Chromium									-0.189	B	P
Cobalt									0.200	U	P
Copper									0.240	U	P
Iron									3.330	U	P
Lead			2.5	B					0.241	B	P
Magnesium									17.830	U	P
Manganese									0.070	U	P
Nickel									-0.304	B	P
Potassium									39.300	U	P
Selenium			1.7	U					0.170	U	P
Silver									0.220	U	P
Sodium									87.810	B	P
Thallium									0.570	U	P
Vanadium									0.200	U	P
Zinc									0.198	B	P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	-33.7	B	-38.2	B	-62.3	B	-47.6	B			P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U			P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U			P
Barium	5.9	U	5.9	U	5.9	U	5.9	U			P
Beryllium	0.3	B	0.3	B	0.4	B	0.4	B			P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U			P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U			P
Chromium	-2.7	B	-2.5	B	-2.6	B	-2.3	B			P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U			P
Copper	2.4	U	2.4	U	2.4	U	2.4	U			P
Iron	33.3	U	33.3	U	33.3	U	33.3	U			P
Lead	1.3	U	1.3	U	1.3	U	1.3	U			P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U			P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Nickel	2.1	U	2.1	U	2.1	U	2.1	U			P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U			P
Silver	2.2	U	2.2	U	2.2	U	2.2	U			P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U			P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U			P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U			P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U			P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			-44.1	B	-34.7	B					P
Antimony			4.7	U	4.7	U					P
Arsenic			4.8	U	4.8	U					P
Barium			5.9	U	5.9	U					P
Beryllium			0.4	B	0.4	B					P
Cadmium			0.6	U	0.6	U					P
Calcium			182.1	U	182.1	U					P
Chromium			-2.5	B	-2.6	B					P
Cobalt			2.0	U	2.0	U					P
Copper			2.4	U	2.4	U					P
Iron			33.3	U	33.3	U					P
Lead			1.3	U	1.3	U					P
Magnesium			178.3	U	178.3	U					P
Manganese			0.7	U	0.7	U					P
Nickel			2.1	U	2.1	U					P
Potassium			393.0	U	393.0	U					P
Silver			2.2	U	2.2	U					P
Sodium			472.7	U	472.7	U					P
Thallium			5.7	U	5.7	U					P
Vanadium			2.0	U	2.0	U					P
Zinc			1.0	U	1.0	U					P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.467	U	AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide			10.0	U							AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Manganese			0.7	U							P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.490	U	AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide			10.0	U							AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.495	U	AS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	44	1	45.6	103.6	1	47.2	107.3
Selenium	0	48	-2	43.6	90.8	-3	51.2	106.7

USEPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	490000	494600.0	102.5	491700	489100.0	101.3
Antimony	0	596	-3	599.9	100.7	-3	593.3	99.5
Arsenic	0	102	6	104.5	102.5	3	100.4	98.4
Barium	0	503	2	495.0	98.4	2	487.6	96.9
Beryllium	0	482	0	475.8	98.7	0	468.5	97.2
Cadmium	0	938	0	927.3	98.9	-1	913.8	97.4
Calcium	500000	477840	481800	488500.0	102.2	480800	482000.0	100.9
Chromium	0	483	1	473.9	98.1	1	465.2	96.3
Cobalt	0	457	-1	455.4	99.6	-1	446.9	97.8
Copper	0	526	3	507.7	96.5	3	500.0	95.1
Iron	200000	191980	197000	197200.0	102.7	197200	195000.0	101.6
Lead	0	49	-2	41.9	85.5	-1	42.2	86.1
Magnesium	500000	521880	527200	535000.0	102.5	524900	526600.0	100.9
Manganese	0	474	1	466.7	98.5	1	455.4	96.1
Nickel	0	952	2	943.0	99.1	2	925.3	97.2
Potassium	0	0	-40	-6.4		36	43.4	
Silver	0	213	1	212.5	99.8	1	209.1	98.2
Sodium	0	0	-231	-127.1		-141	-125.0	
Thallium	0	89	2	91.6	102.9	0	88.7	99.7
Vanadium	0	478	4	467.1	97.7	4	458.9	96.0
Zinc	0	998	3	995.5	99.7	3	981.9	98.4

USEPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Manganese	0	474	1	477.0	100.6	1	487.1	102.8

USEPA - CLP

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTPSD53S

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 78.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		9962.3857		10187.6797		221.26	-101.8		P
Antimony	75 - 125	27.7796		2.0136	B	55.32	46.6	N	P
Arsenic		113.9507		129.6179		4.43	-353.7		P
Barium	75 - 125	338.2011		139.4708		221.26	89.8		P
Beryllium	75 - 125	5.4696		0.2433	B	5.53	94.5		P
Cadmium	75 - 125	6.1710		0.9585		5.53	94.3		P
Chromium	75 - 125	29.3285		10.3599		22.13	85.7		P
Cobalt	75 - 125	57.6723		6.9477		55.32	91.7		P
Copper	75 - 125	43.7327		18.1274		27.66	92.6		P
Iron		19637.1309		21618.9395		110.63	-1791.4		P
Lead		32.2270		38.2158		2.21	-271.0		P
Manganese		406.5716		364.1738		55.32	76.6		P
Mercury	75 - 125	0.3280		0.1128		0.20	107.6		CV
Nickel	75 - 125	57.5064		6.2417		55.32	92.7		P
Selenium	75 - 125	1.3630		0.4391	B	1.11	83.2		P
Silver	75 - 125	6.6622		1.7659		5.53	88.5		P
Thallium	75 - 125	5.4420		0.6896	B	5.53	85.9		P
Vanadium	75 - 125	94.5237		52.0863		55.32	76.7		P
Zinc	75 - 125	193.7161		149.5150		55.32	79.9		P
Cyanide	75 - 125	5.8886		0.5731	U	5.73	102.8		AS

Comments:

USEPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTPSD53A

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS _____ SDG No.: GCD002

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		107200.00		106500.00		2000.0	35.0		P
Antimony		518.30		21.05	B	500.0	99.4		P
Arsenic		1360.00		1355.00		40.0	12.5		P
Barium		3410.00		1458.00		2000.0	97.6		P
Beryllium		51.86		2.54	B	50.0	98.6		P
Cadmium		58.24		10.02		50.0	96.4		P
Chromium		307.60		108.30		200.0	99.6		P
Cobalt		554.40		72.63		500.0	96.4		P
Copper		447.60		189.50		250.0	103.2		P
Iron		222400.00		226000.00		1000.0	-360.0		P
Lead		412.50		399.50		20.0	65.0		P
Manganese		4214.00		3807.00		500.0	81.4		P
Nickel		549.60		65.25		500.0	96.9		P
Selenium		14.44		4.59	B	10.0	98.5		P
Silver		68.76		18.46		50.0	100.6		P
Thallium		53.70		7.21	B	50.0	93.0		P
Vanadium		1036.00		544.50		500.0	98.3		P
Zinc		2008.00		1563.00		500.0	89.0		P
Cyanide		21.48		10.00	U	20.0	107.4		AS

Comments: _____

6
DUPLICATES

SAMPLE NO.

GRANSTPSD53D

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 78.6 % Solids for Duplicate: 81.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		10187.6797		6896.9580		38.5	*	P
Antimony		2.0136	B	1.5673	B	24.9		P
Arsenic		129.6179		120.7048		7.1		P
Barium	19.1	139.4708		98.0713		34.9	*	P
Beryllium		0.2433	B	0.1891	B	25.1		P
Cadmium	0.5	0.9585		0.8358		13.7		P
Calcium	478.3	2184.8521		1470.0540		39.1	*	P
Chromium		10.3599		6.0352		52.8	*	P
Cobalt		6.9477		5.1340	B	30.0		P
Copper	2.4	18.1274		12.2950		38.3	*	P
Iron		21618.9395		14647.0801		38.4	*	P
Lead		38.2158		70.2204		59.0	*	P
Magnesium		4785.8188		2975.3889		46.7	*	P
Manganese		364.1738		302.8845		18.4		P
Mercury	0.0	0.1128		0.1996		55.6	*	CV
Nickel		6.2417		3.8895	B	46.4		P
Potassium	478.3	2840.1160		2122.2229		28.9	*	P
Selenium		0.4391	B	0.4494	B	2.3		P
Silver	1.0	1.7659		1.7256		2.3		P
Sodium		45.2180	U	53.8200	B	200.0		P
Thallium		0.6896	B	0.6094	U	200.0		P
Vanadium		52.0863		32.6298		45.9	*	P
Zinc		149.5150		94.4576		45.1	*	P
Cyanide		0.5731	U	0.5783	U			AS

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	5.7		5.4 - 6.6	95.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Mercury				0.1	0.1		0.1 0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Mercury				0.1	0.1		0.1 0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum				200.0	205.1		160.0 240.0	102.6
Antimony				50.0	50.1		40.0 60.0	100.2
Arsenic				24.0	22.7		19.2 28.8	94.6
Barium				200.0	197.9		160.0 240.0	99.0
Beryllium				5.0	5.0		4.0 6.0	100.0
Cadmium				25.0	24.7		20.0 30.0	98.8
Calcium				2000.0	2043.0		1600.0 2400.0	102.2
Chromium				20.0	20.1		16.0 24.0	100.5
Cobalt				50.0	49.0		40.0 60.0	98.0
Copper				25.0	25.9		20.0 30.0	103.6
Iron				100.0	99.3		80.0 120.0	99.3
Lead				22.0	21.4		17.6 26.4	97.3
Magnesium				2000.0	1984.0		1600.0 2400.0	99.2
Manganese				50.0	49.9		40.0 60.0	99.8
Nickel				50.0	49.0		40.0 60.0	98.0
Potassium				2000.0	1989.0		1600.0 2400.0	99.4
Selenium				21.0	19.2		16.8 25.2	91.4
Silver				25.0	25.2		20.0 30.0	100.8
Sodium				2000.0	2043.0		1600.0 2400.0	102.2
Thallium				25.0	23.8		20.0 30.0	95.2
Vanadium				50.0	50.3		40.0 60.0	100.6
Zinc				50.0	49.5		40.0 60.0	99.0

7
LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	206.0		160.0	240.0	103.0
Antimony				50.0	49.8		40.0	60.0	99.6
Arsenic				24.0	22.7		19.2	28.8	94.6
Barium				200.0	199.2		160.0	240.0	99.6
Beryllium				5.0	5.0		4.0	6.0	100.0
Cadmium				25.0	24.6		20.0	30.0	98.4
Calcium				2000.0	2031.0		1600.0	2400.0	101.6
Chromium				20.0	20.0		16.0	24.0	100.0
Cobalt				50.0	48.6		40.0	60.0	97.2
Copper				25.0	26.0		20.0	30.0	104.0
Iron				100.0	100.1		80.0	120.0	100.1
Lead				22.0	21.6		17.6	26.4	98.2
Magnesium				2000.0	1968.0		1600.0	2400.0	98.4
Manganese				50.0	49.5		40.0	60.0	99.0
Nickel				50.0	48.9		40.0	60.0	97.8
Potassium				2000.0	2006.0		1600.0	2400.0	100.3
Selenium				21.0	19.5		16.8	25.2	92.9
Silver				25.0	25.3		20.0	30.0	101.2
Sodium				2000.0	2070.0		1600.0	2400.0	103.5
Thallium				25.0	23.5		20.0	30.0	94.0
Vanadium				50.0	50.2		40.0	60.0	100.4
Zinc				50.0	49.4		40.0	60.0	98.8

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	6.1		5.4 6.6	101.7

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Cyanide				6.0	6.0		5.4	6.6	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	5.9		5.4 6.6	98.3

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	6.6		5.4 6.6	110.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Mercury				0.1	0.1		0.1	0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	208.3		160.0	240.0	104.2
Antimony				50.0	50.2		40.0	60.0	100.4
Arsenic				24.0	23.1		19.2	28.8	96.2
Barium				200.0	200.4		160.0	240.0	100.2
Beryllium				5.0	5.1		4.0	6.0	102.0
Cadmium				25.0	25.0		20.0	30.0	100.0
Calcium				2000.0	2066.0		1600.0	2400.0	103.3
Chromium				20.0	20.3		16.0	24.0	101.5
Cobalt				50.0	49.4		40.0	60.0	98.8
Copper				25.0	26.3		20.0	30.0	105.2
Iron				100.0	100.9		80.0	120.0	100.9
Lead				22.0	21.9		17.6	26.4	99.5
Magnesium				2000.0	2007.0		1600.0	2400.0	100.4
Manganese				50.0	50.1		40.0	60.0	100.2
Nickel				50.0	49.4		40.0	60.0	98.8
Potassium				2000.0	2026.0		1600.0	2400.0	101.3
Selenium				21.0	19.3		16.8	25.2	91.9
Silver				25.0	25.6		20.0	30.0	102.4
Sodium				2000.0	2087.0		1600.0	2400.0	104.4
Thallium				25.0	23.7		20.0	30.0	94.8
Vanadium				50.0	50.9		40.0	60.0	101.8
Zinc				50.0	50.0		40.0	60.0	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Cyanide				6.0	5.9		5.4	6.6	98.3

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Cyanide				6.0	5.9		5.4	6.6	98.3

9
ICP SERIAL DILUTIONS

SAMPLE NO.

GRANSTPSD53L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	106500.00		110500.00		3.8		P
Antimony	21.05	B	23.50	U	100.0		P
Arsenic	1355.00		1452.00		7.2		P
Barium	1458.00		1481.00		1.6		P
Beryllium	2.54	B	3.87	B	52.4		P
Cadmium	10.02		10.80	B	7.8		P
Calcium	22840.00		23820.00	B	4.3		P
Chromium	108.30		102.90		5.0		P
Cobalt	72.63		76.71	B	5.6		P
Copper	189.50		186.10		1.8		P
Iron	226000.00		235300.00		4.1		P
Lead	399.50		433.70		8.6		P
Magnesium	50030.00		51900.00		3.7		P
Manganese	3807.00		3960.00		4.0		P
Nickel	65.25		82.25	B	26.1		P
Potassium	29690.00		32680.00		10.1	E	P
Selenium	4.59	B	8.50	U	100.0		P
Silver	18.46		22.59	B	22.4		P
Sodium	472.70	U	2363.50	U			P
Thallium	7.21	B	28.50	U	100.0		P
Vanadium	544.50		561.60		3.1		P
Zinc	1563.00		1664.00		6.5		P

USEPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

ICP ID Number: Date: 7/1/2003

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

USEPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: _____ Date: 7/1/2003

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments: _____

USEPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Iron	271.441		100	33.3	P
Lead	220.353		3	1.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Thallium	190.864		10	5.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Lead	220.353		3	1.5	P
Selenium	196.026		5	1.7	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for: Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

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ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

USEPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Iron	10.00	1000000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments: _____

USEPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Lead	10.00	50000.0	P
Selenium	10.00	5000.0	P

Comments: _____

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXPDSSD06	7/30/2003	1.07	50.0
AJAXSTPSD04	7/30/2003	1.32	50.0
AJAXSTRSD04	7/30/2003	1.09	50.0
AJAXSTSSD52	7/30/2003	1.08	50.0
GRANSTPSD54	7/30/2003	1.21	50.0
GRANSTRSD53	7/30/2003	1.03	50.0
GRANSTRSD54	7/30/2003	1.05	50.0
ICV	7/30/2003	50.0	50.0
LCS0730B	7/30/2003	1.00	50.0
LCSD0730B	7/30/2003	1.00	50.0
MAGNPDSSD11	7/30/2003	1.10	50.0
MAGNSTPSD01	7/30/2003	1.03	50.0
MAGNSTPSD03	7/30/2003	1.13	50.0
PBS0730B	7/30/2003	1.00	50.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
GRANSTPSD53	7/31/2003	1.11	50.0
GRANSTPSD53D	7/31/2003	1.10	50.0
GRANSTPSD53S	7/31/2003	1.11	50.0
ICV	7/31/2003	50.0	50.0
LCSD0731C	7/31/2003	1.00	50.0
PBS0731C	7/31/2003	1.07	50.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLUESTPSD05	8/1/2003	1.16	50.0
BLUESTPSD05100	8/1/2003	1.33	50.0
ICV	8/1/2003	50.0	50.0
LCS0801A	8/1/2003	1.00	50.0
LCSD0801A	8/1/2003	1.00	50.0
PBS0801A	8/1/2003	1.02	50.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLUESTPSD06	8/1/2003	1.02	50.0
BLUESTPSD07	8/1/2003	1.03	50.0
BLUESTPSD08	8/1/2003	1.11	50.0
BLUESTRSD08	8/1/2003	1.06	50.0
ICV	8/1/2003	50.0	50.0
LCS0801B	8/1/2003	1.00	50.0
LCSD0801B	8/1/2003	1.00	50.0
PBS0801B	8/1/2003	1.01	50.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXPDSSD06	8/8/2003	0.67	100.0
AJAXSTPSD04	8/8/2003	0.60	100.0
AJAXSTRSD04	8/8/2003	0.62	100.0
AJAXSTSSD52	8/8/2003	0.62	100.0
GRANSTPSD53	8/8/2003	0.61	100.0
GRANSTPSD53D	8/8/2003	0.61	100.0
GRANSTPSD53S	8/8/2003	0.64	100.0
GRANSTPSD54	8/8/2003	0.66	100.0
GRANSTRSD53	8/8/2003	0.64	100.0
GRANSTRSD54	8/8/2003	0.60	100.0
LCSS0808B	8/8/2003	1.00	100.0
MAGNPDSSD11	8/8/2003	0.62	100.0
MAGNSTPSD01	8/8/2003	0.68	100.0
MAGNSTPSD02	8/8/2003	0.63	100.0
MAGNSTPSD03	8/8/2003	0.66	100.0
PBS0808B	8/8/2003	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLUESTPSD05	8/13/2003	0.64	100.0
BLUESTPSD05100	8/13/2003	0.66	100.0
BLUESTPSD06	8/13/2003	0.64	100.0
BLUESTPSD07	8/13/2003	0.61	100.0
BLUESTPSD08	8/13/2003	0.67	100.0
BLUESTRSD08	8/13/2003	0.60	100.0
LCSDS0813A	8/13/2003	1.00	100.0
LCSS0813A	8/13/2003	1.00	100.0
PBS0813A	8/13/2003	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLUESTPSD05	8/16/2003	1.24	100.0
BLUESTPSD05100	8/16/2003	1.36	100.0
BLUESTPSD06	8/16/2003	1.11	100.0
BLUESTPSD07	8/16/2003	1.30	100.0
BLUESTPSD08	8/16/2003	1.25	100.0
BLUESTRSD08	8/16/2003	1.18	100.0
LCSDS0816A	8/16/2003	1.00	100.0
LCSS0816A	8/16/2003	1.00	100.0
PBS0816A	8/16/2003	1.00	100.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXPDSSD06	8/16/2003	1.19	100.0
AJAXSTPSD04	8/16/2003	1.11	100.0
AJAXSTRSD04	8/16/2003	1.17	100.0
AJAXSTSSD52	8/16/2003	1.25	100.0
GRANSTPSD53	8/16/2003	1.33	100.0
GRANSTPSD53D	8/16/2003	1.19	100.0
GRANSTPSD53S	8/16/2003	1.15	100.0
GRANSTPSD54	8/16/2003	1.21	100.0
GRANSTRSD53	8/16/2003	1.28	100.0
GRANSTRSD54	8/16/2003	1.35	100.0
LCSS0816C	8/16/2003	1.00	100.0
MAGNPDSSD11	8/16/2003	1.32	100.0
MAGNSTPSD01	8/16/2003	1.35	100.0
MAGNSTPSD02	8/16/2003	1.23	100.0
MAGNSTPSD03	8/16/2003	1.23	100.0
PBS0816C	8/16/2003	1.00	100.0

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/30/2003 End Date: 7/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1650																								X
S10	1.00	1651																								X
S30	1.00	1652																								X
S50	1.00	1653																								X
S100	1.00	1654																								X
S200	1.00	1655																								X
S300	1.00	1656																								X
ICV	1.00	1658																								X
ICB	1.00	1659																								X
LRS	1.00	1700																								X
LRS	1.00	1701																								X
CCV	1.00	1702																								X
CCB	1.00	1703																								X
ZZZZZZ	1.00	1704																								
PBS0730B	1.00	1705																								X
LCS0730B	1.00	1706																								X
ZZZZZZ	1.00	1707																								
ZZZZZZ	1.00	1708																								
ZZZZZZ	1.00	1709																								
ZZZZZZ	1.00	1710																								
ZZZZZZ	1.00	1711																								
ZZZZZZ	1.00	1711																								
ZZZZZZ	1.00	1712																								
CCV	1.00	1713																								X
CCB	1.00	1714																								X
ZZZZZZ	1.00	1715																								
ZZZZZZ	1.00	1716																								
AJAXSTPSD04	1.00	1717																								X
AJAXPDSSD06	1.00	1718																								X
AJAXSTRSD04	1.00	1719																								X
AJAXSTSSD52	1.00	1720																								X
GRANSTRSD54	1.00	1721																								X
GRANSTPSD54	1.00	1722																								X
MAGNSTPSD03	1.00	1723																								X
MAGNPDSSD11	1.00	1724																								X
CCV	1.00	1725																								X
CCB	1.00	1726																								X
MAGNSTPSD02	1.00	1727																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/30/2003 End Date: 7/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MAGNSTPSD01	1.00	1728																								X
GRANSTRSD53	1.00	1729																								X
LCSD0730B	1.00	1730																								X
CCV	1.00	1731																								X
CCB	1.00	1732																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/31/2003 End Date: 7/31/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1728																								X
S10	1.00	1729																								X
S30	1.00	1730																								X
S50	1.00	1731																								X
S100	1.00	1732																								X
S200	1.00	1733																								X
S300	1.00	1734																								X
ICV	1.00	1735																								X
ICB	1.00	1736																								X
LRS	1.00	1737																								X
LRS	1.00	1738																								X
CCV	1.00	1739																								X
CCB	1.00	1740																								X
ZZZZZZ	1.00	1741																								
PBS0731C	1.00	1742																								X
LCSD0731C	1.00	1743																								X
GRANSTPSD53	1.00	1744																								X
GRANSTPSD53D	1.00	1745																								X
GRANSTPSD53S	1.00	1746																								X
ZZZZZZ	1.00	1747																								
ZZZZZZ	1.00	1748																								
ZZZZZZ	1.00	1749																								
ZZZZZZ	1.00	1750																								
CCV	1.00	1751																								X
CCB	1.00	1752																								X
ZZZZZZ	1.00	1753																								
ZZZZZZ	1.00	1754																								
ZZZZZZ	1.00	1755																								
ZZZZZZ	1.00	1756																								
ZZZZZZ	1.00	1757																								
ZZZZZZ	1.00	1758																								
ZZZZZZ	1.00	1759																								
ZZZZZZ	1.00	1800																								
ZZZZZZ	1.00	1801																								
ZZZZZZ	1.00	1802																								
CCV	1.00	1803																								X
CCB	1.00	1803																								X
GRANSTPSD53A	1.00	1804																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/31/2003 End Date: 7/31/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1805																								
ZZZZZZ	1.00	1806																								
CCV	1.00	1807																								X
CCB	1.00	1808																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 8/1/2003 End Date: 8/1/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1352																								X
S10	1.00	1353																								X
S30	1.00	1354																								X
S50	1.00	1355																								X
S100	1.00	1356																								X
S200	1.00	1357																								X
S300	1.00	1358																								X
ICV	1.00	1400																								X
ICB	1.00	1401																								X
LRS	1.00	1402																								X
LRS	1.00	1403																								X
CCV	1.00	1404																								X
CCB	1.00	1405																								X
ZZZZZZ	1.00	1406																								
PBS0801A	1.00	1407																								X
LCS0801A	1.00	1408																								X
LCSD0801A	1.00	1409																								X
ZZZZZZ	1.00	1410																								
ZZZZZZ	1.00	1411																								
ZZZZZZ	1.00	1412																								
ZZZZZZ	1.00	1413																								
ZZZZZZ	1.00	1414																								
ZZZZZZ	1.00	1414																								
CCV	1.00	1415																								X
CCB	1.00	1416																								X
ZZZZZZ	1.00	1417																								
ZZZZZZ	1.00	1418																								
ZZZZZZ	1.00	1419																								
ZZZZZZ	1.00	1420																								
ZZZZZZ	1.00	1421																								
ZZZZZZ	1.00	1422																								
ZZZZZZ	1.00	1423																								
ZZZZZZ	1.00	1424																								
ZZZZZZ	1.00	1425																								
ZZZZZZ	1.00	1426																								
CCV	1.00	1427																								X
CCB	1.00	1428																								X
ZZZZZZ	1.00	1429																								

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 8/1/2003 End Date: 8/1/2003

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1430																								
BLUESTPSD05	1.00	1431																								X
BLUESTPSD05100	1.00	1432																								X
CCV	1.00	1433																								X
CCB	1.00	1434																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 8/1/2003 End Date: 8/1/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1707																								X
S10	1.00	1708																								X
S30	1.00	1709																								X
S50	1.00	1710																								X
S100	1.00	1711																								X
S200	1.00	1712																								X
S300	1.00	1713																								X
ICV	1.00	1715																								X
ICB	1.00	1716																								X
LRS	1.00	1717																								X
LRS	1.00	1718																								X
CCV	1.00	1719																								X
CCB	1.00	1720																								X
ZZZZZZ	1.00	1721																								
PBS0801B	1.00	1722																								X
LCS0801B	1.00	1723																								X
LCSD0801B	1.00	1724																								X
ZZZZZZ	1.00	1724																								
ZZZZZZ	1.00	1725																								
ZZZZZZ	1.00	1726																								
ZZZZZZ	1.00	1727																								
ZZZZZZ	1.00	1728																								
ZZZZZZ	1.00	1729																								
CCV	1.00	1730																								X
CCB	1.00	1731																								X
ZZZZZZ	1.00	1732																								
ZZZZZZ	1.00	1733																								
ZZZZZZ	1.00	1734																								
ZZZZZZ	1.00	1735																								
BLUESTPSD06	1.00	1736																								X
BLUESTRSD08	1.00	1737																								X
BLUESTPSD08	1.00	1738																								X
BLUESTPSD07	1.00	1739																								X
ZZZZZZ	1.00	1740																								
ZZZZZZ	1.00	1741																								
CCV	1.00	1742																								X
CCB	1.00	1743																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/30/2003 End Date: 8/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0107													X						X									
S	1.00	0111																												
S	1.00	0114													X						X									
S	1.00	0118																												
LRS	1.00	0123													X						X									
LRS	1.00	0127													X						X									
LRS	1.00	0131													X						X									
ICV	1.00	0135													X						X									
ICB	1.00	0139													X						X									
ICSA	1.00	0143													X						X									
ICSAB	1.00	0147													X						X									
CRI	1.00	0152													X						X									
CCV	1.00	0156													X						X									
CCB	1.00	0200													X						X									
PBS0816C	1.00	0204													X						X									
LCSS0816C	1.00	0208													X						X									
AJAXSTPSD04	1.00	0212													X						X									
AJAXPDSSD06	1.00	0216													X						X									
AJAXSTRSD04	1.00	0220													X						X									
AJAXSTSSD52	1.00	0224													X						X									
GRANSTRSD54	1.00	0228													X						X									
GRANSTPSD54	1.00	0233													X						X									
MAGNSTPSD03	1.00	0237													X						X									
MAGNPDSSD11	1.00	0241													X						X									
CCV	1.00	0245													X						X									
CCB	1.00	0249													X						X									
MAGNSTPSD02	1.00	0253													X						X									
MAGNSTPSD01	1.00	0257													X						X									
GRANSTPSD53	1.00	0301													X						X									
GRANSTPSD53L	5.00	0305													X						X									
GRANSTPSD53A	1.00	0310													X						X									
GRANSTPSD53D	1.00	0314													X						X									
GRANSTPSD53S	1.00	0318													X						X									
GRANSTRSD53	1.00	0322													X						X									
PBS0816A	1.00	0326																			X									
LCSS0816A	1.00	0330																			X									
CCV	1.00	0334													X						X									
CCB	1.00	0338													X						X									

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/30/2003 End Date: 8/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
LCSDS0816A	1.00	0342																		X						
BLUESTPSD05	1.00	0346																		X						
BLUESTPSD05100	1.00	0350																		X						
BLUESTPSD06	1.00	0355																		X						
BLUESTRSD08	1.00	0359																		X						
BLUESTPSD08	1.00	0403																		X						
BLUESTPSD07	1.00	0407																		X						
ICSA	1.00	0411													X					X						
ICSAB	1.00	0415													X					X						
CRI	1.00	0419													X					X						
CCV	1.00	0423													X					X						
CCB	1.00	0428													X					X						

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/7/2003 End Date: 9/7/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1452		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
S	1.00	1457		X						X				X		X				X			X				
S	1.00	1501			X	X									X									X			
S	1.00	1505					X	X	X		X	X	X				X		X			X			X	X	
LRS	1.00	1510		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
LRS	1.00	1515		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
LRS	1.00	1521		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
ICV	1.00	1526		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
ICB	1.00	1531		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
ICSA	1.00	1536		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
ICSAB	1.00	1541		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CRI	1.00	1546		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCV	1.00	1551		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCB	1.00	1556		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
PBS0816C	1.00	1602		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
LCSS0816C	1.00	1607		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
AJAXSTPSD04	1.00	1612		X	X	X	X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X	
AJAXPDSSD06	1.00	1617		X	X	X	X	X	X	X	X	X	X			X			X	X		X	X		X		
AJAXSTRSD04	1.00	1622		X	X		X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X	
AJAXSTSSD52	1.00	1627		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTRSD54	1.00	1632		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTPSD54	1.00	1637		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
MAGNSTPSD03	1.00	1642		X	X		X	X	X	X	X	X	X	X		X			X	X		X	X	X	X	X	
MAGNPDSSD11	1.00	1647		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
CCV	1.00	1652		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCB	1.00	1657		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
MAGNSTPSD02	1.00	1702		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
MAGNSTPSD01	1.00	1707		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTPSD53	1.00	1712		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTPSD53L	5.00	1717		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTPSD53A	1.00	1722		X	X	X	X	X	X		X	X	X	X			X		X			X		X	X	X	
GRANSTPSD53D	1.00	1727		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
GRANSTPSD53S	1.00	1732		X	X	X	X	X	X		X	X	X	X			X		X			X		X	X	X	
GRANSTRSD53	1.00	1737		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X		X	X	X	X	X	
PBS0816A	1.00	1742		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
LCSS0816A	1.00	1747		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCV	1.00	1752		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCB	1.00	1758		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/7/2003 End Date: 9/7/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
LCSDS0816A	1.00	1803		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTPSD05	1.00	1808		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTPSD05100	1.00	1813		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTPSD06	1.00	1818		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTRSD08	1.00	1823		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTPSD08	1.00	1828		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
BLUESTPSD07	1.00	1833		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
AJAXSTPSD04	10.00	1838															X										
AJAXPDSSD06	10.00	1843												X										X		X	
AJAXSTRSD04	10.00	1848				X											X										
CCV	1.00	1853		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCB	1.00	1858		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
MAGNSTPSD03	10.00	1903				X											X										
ICSA	1.00	1908		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
ICSAB	1.00	1913		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CRI	1.00	1919		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCV	1.00	1924		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	
CCB	1.00	1929		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/8/2003 End Date: 9/9/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2204															X										
S	1.00	2209																									
S	1.00	2213																									
S	1.00	2217															X										
LRS	1.00	2223															X										
LRS	1.00	2228															X										
LRS	1.00	2233															X										
ICV	1.00	2238															X										
ICB	1.00	2243															X										
ICSA	1.00	2248															X										
ICSAB	1.00	2254															X										
CRI	1.00	2259															X										
CRILOW	1.00	2304															X										
CCV	1.00	2309															X										
CCB	1.00	2314															X										
ZZZZZZ	1.00	2319																									
ZZZZZZ	1.00	2324																									
ZZZZZZ	1.00	2329																									
ZZZZZZ	5.00	2334																									
ZZZZZZ	1.00	2339																									
ZZZZZZ	1.00	2344																									
ZZZZZZ	5.00	2349																									
ZZZZZZ	1.00	2354																									
ZZZZZZ	1.00	2359																									
ZZZZZZ	1.00	0004																									
CCV	1.00	0009															X										
CCB	1.00	0015															X										
ZZZZZZ	5.00	0020																									
ZZZZZZ	1.00	0025																									
ZZZZZZ	1.00	0030																									
AJAXPDSSD06	100.00	0035															X										
ZZZZZZ	1.00	0040																									
ZZZZZZ	1.00	0045																									
ZZZZZZ	1.00	0050																									
ZZZZZZ	1.00	0055																									
ZZZZZZ	5.00	0100																									
ZZZZZZ	1.00	0105																									
CCV	1.00	0110															X										

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/8/2003 End Date: 9/9/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	0115															X										
ZZZZZZ	1.00	0120																									
ZZZZZZ	5.00	0125																									
ZZZZZZ	1.00	0130																									
ZZZZZZ	1.00	0135																									
ZZZZZZ	5.00	0140																									
ZZZZZZ	1.00	0145																									
ICSA	1.00	0150															X										
ICSAB	1.00	0156															X										
CRI	1.00	0201															X										
CRILOW	1.00	0206															X										
CCV	1.00	0211															X										
CCB	1.00	0216															X										

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/14/2003 End Date: 8/14/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1016																X									
S0.2	1.00	1018																X									
S0.5	1.00	1019																X									
S1	1.00	1021																X									
S5	1.00	1023																X									
S10	1.00	1025																X									
ICV	1.00	1027																X									
ICB	1.00	1029																X									
CRA	1.00	1031																X									
CCV	1.00	1033																X									
CCB	1.00	1035																X									
PBS0808B	1.00	1036																X									
LCSS0808B	1.00	1038																X									
ZZZZZZ	1.00	1040																									
ZZZZZZ	1.00	1042																									
ZZZZZZ	1.00	1044																									
ZZZZZZ	1.00	1046																									
ZZZZZZ	1.00	1048																									
ZZZZZZ	1.00	1049																									
ZZZZZZ	1.00	1051																									
CCV	1.00	1053																X									
CCB	1.00	1055																X									
ZZZZZZ	1.00	1057																									
ZZZZZZ	1.00	1058																									
ZZZZZZ	1.00	1100																									
AJAXSTPSD04	1.00	1102																X									
AJAXPDSSD06	1.00	1104																X									
AJAXSTRSD04	1.00	1105																X									
AJAXSTSSD52	1.00	1107																X									
GRANSTRSD54	1.00	1109																X									
GRANSTPSD54	1.00	1111																X									
CCV	1.00	1113																X									
CCB	1.00	1115																X									
MAGNSTPSD03	1.00	1116																X									
MAGNPDSSD11	1.00	1118																X									
MAGNSTPSD02	1.00	1120																X									
MAGNSTPSD01	1.00	1122																X									
GRANSTPSD53	1.00	1124																X									

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/14/2003 End Date: 8/14/2003

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
GRANSTPSD53D	1.00	1126																X								
GRANSTPSD53S	1.00	1128																X								
GRANSTRSD53	1.00	1130																X								
ZZZZZZ	1.00	1131																								
CCV	1.00	1133																X								
CCB	1.00	1135																X								

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/14/2003 End Date: 8/14/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1447																X								
S0.2	1.00	1449																X								
S0.5	1.00	1451																X								
S1	1.00	1453																X								
S5	1.00	1454																X								
S10	1.00	1456																X								
ICV	1.00	1458																X								
ICB	1.00	1500																X								
CRA	1.00	1501																X								
CCV	1.00	1503																X								
CCB	1.00	1505																X								
PBS0813A	1.00	1507																X								
LCSS0813A	1.00	1508																X								
LCSDS0813A	1.00	1510																X								
BLUESTPSD05	1.00	1512																X								
BLUESTPSD05100	1.00	1514																X								
BLUESTPSD06	1.00	1516																X								
BLUESTRSD08	1.00	1518																X								
BLUESTPSD08	1.00	1519																X								
BLUESTPSD07	1.00	1521																X								
CCV	1.00	1523																X								
CCB	1.00	1525																X								

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Geotechnical Analysis
Sample Data Summary Package

EASEAT SDG # GCD002

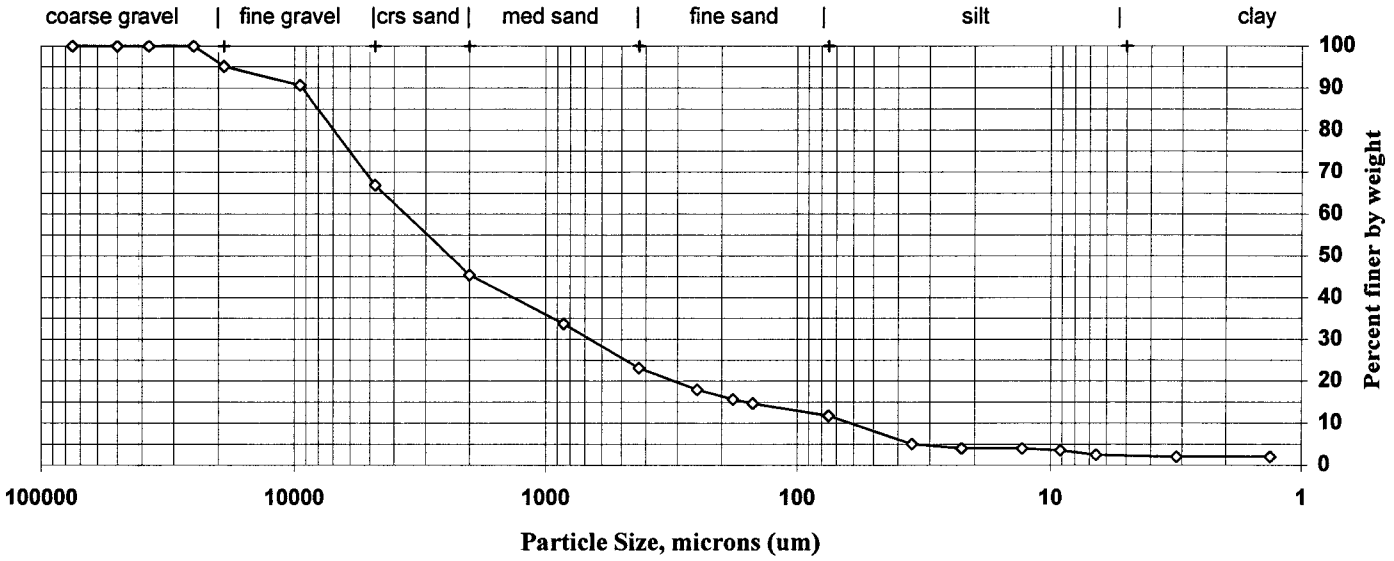
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535363 **Sample ID:** PSD04

Percent Solids:	83.8%		**Maximum Particle Size:**	25 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	95.1	4.9
3/8 inch	9500	90.7	4.4
#4	4750	66.9	23.8
#10	2000	45.4	21.4
#20	850	33.7	11.8
#40	425	23.1	10.6
#60	250	18.0	5.1
#80	180	15.7	2.3
#100	150	14.7	1.0
#200	75	11.8	2.9
Hydrometer	35.2	5.0	6.8
|	22.4	4.0	1.1
|	13.0	4.0	0.0
|	9.1	3.5	0.4
|	6.6	2.4	1.1
|	3.1	2.0	0.4
V	1.3	2.0	0.0

Soil Classification	Percent of Total Sample
Gravel	33.1
Sand	55.1
Coarse Sand	21.4
Medium Sand	22.4
Fine Sand	11.3
Silt	9.4
Clay	2.4

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

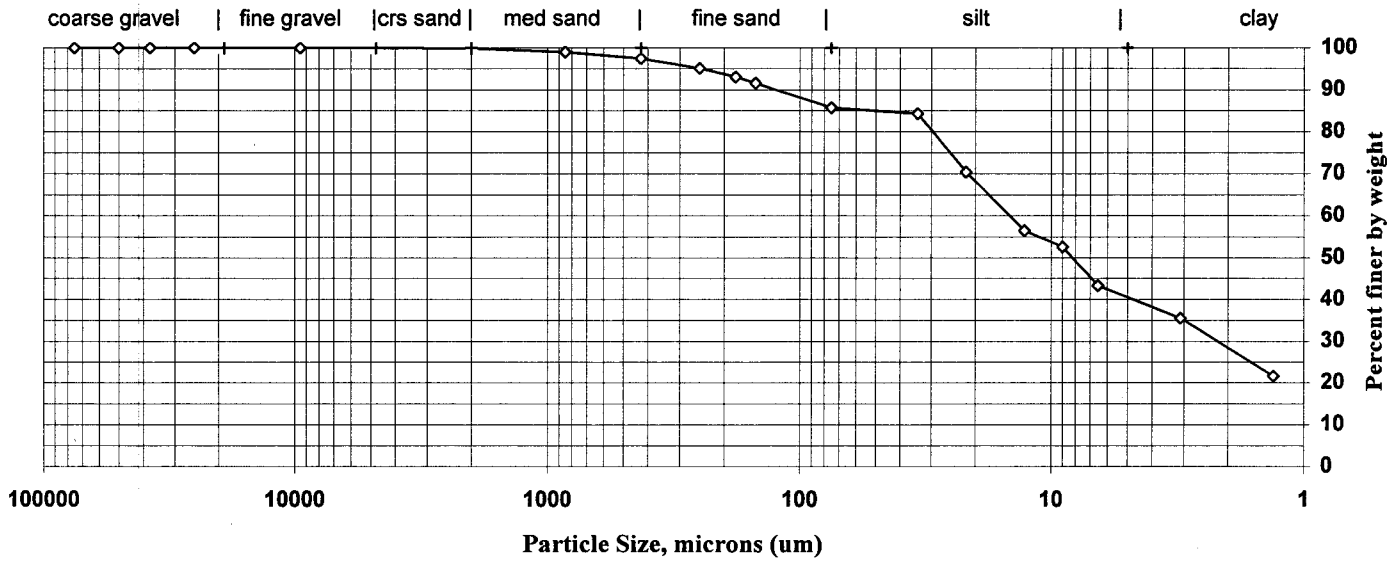
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535364 **Sample ID:** SSD06

Percent Solids:	32.8%		**Maximum Particle Size:**	Crs sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	0.9%		**Hardness (> #10):**	soft	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	99.0	0.9
#40	425	97.5	1.5
#60	250	95.1	2.4
#80	180	93.1	2.0
#100	150	91.6	1.4
#200	75	85.7	5.9
Hydrometer	33.9	84.3	1.4
|	21.8	70.4	13.9
|	12.8	56.5	13.9
|	9.0	52.6	3.9
|	6.5	43.3	9.3
|	3.1	35.6	7.7
V	1.3	21.7	13.9

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	14.3
Coarse Sand	0.1
Medium Sand	2.4
Fine Sand	11.8
Silt	42.4
Clay	43.3

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

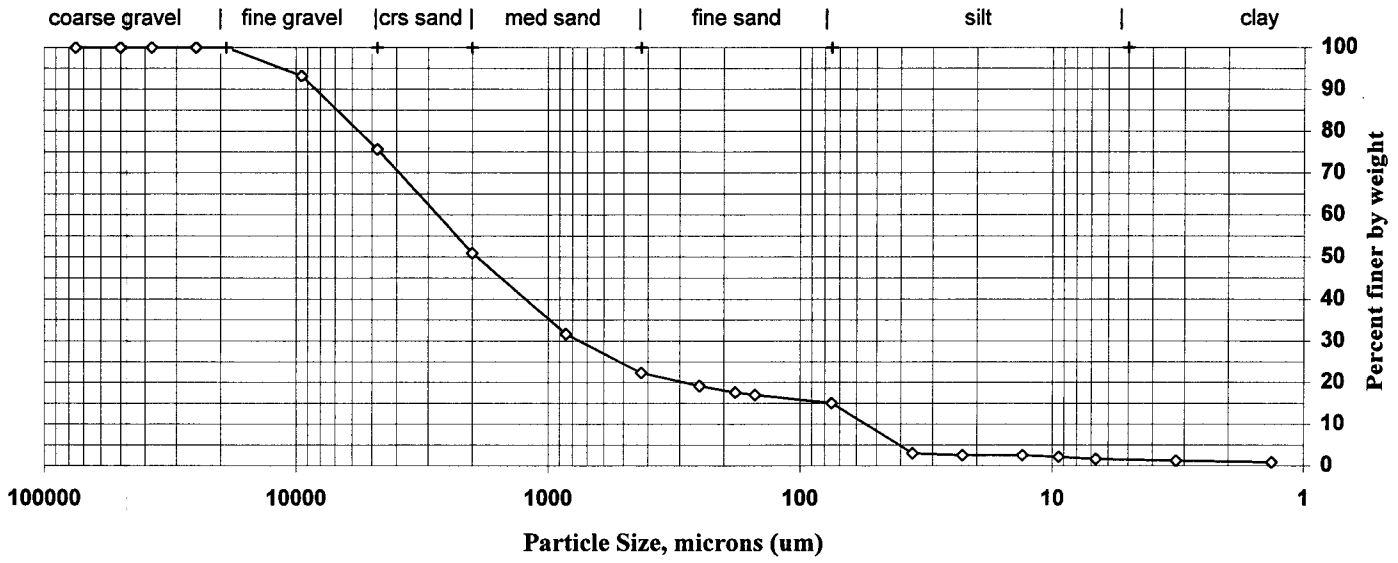
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535365 **Sample ID:** RSD04

Percent Solids:	83.7%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	93.2	6.8
#4	4750	75.6	17.6
#10	2000	50.9	24.7
#20	850	31.6	19.3
#40	425	22.3	9.3
#60	250	19.2	3.1
#80	180	17.7	1.5
#100	150	17.1	0.6
#200	75	15.0	2.0
Hydrometer	35.9	3.0	12.0
|	22.8	2.5	0.5
|	13.2	2.5	0.0
|	9.4	2.1	0.4
|	6.7	1.6	0.5
|	3.2	1.2	0.4
V	1.3	0.8	0.4

Soil Classification	Percent of Total Sample
Gravel	24.4
Sand	60.6
Coarse Sand	24.7
Medium Sand	28.6
Fine Sand	7.3
Silt	13.4
Clay	1.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

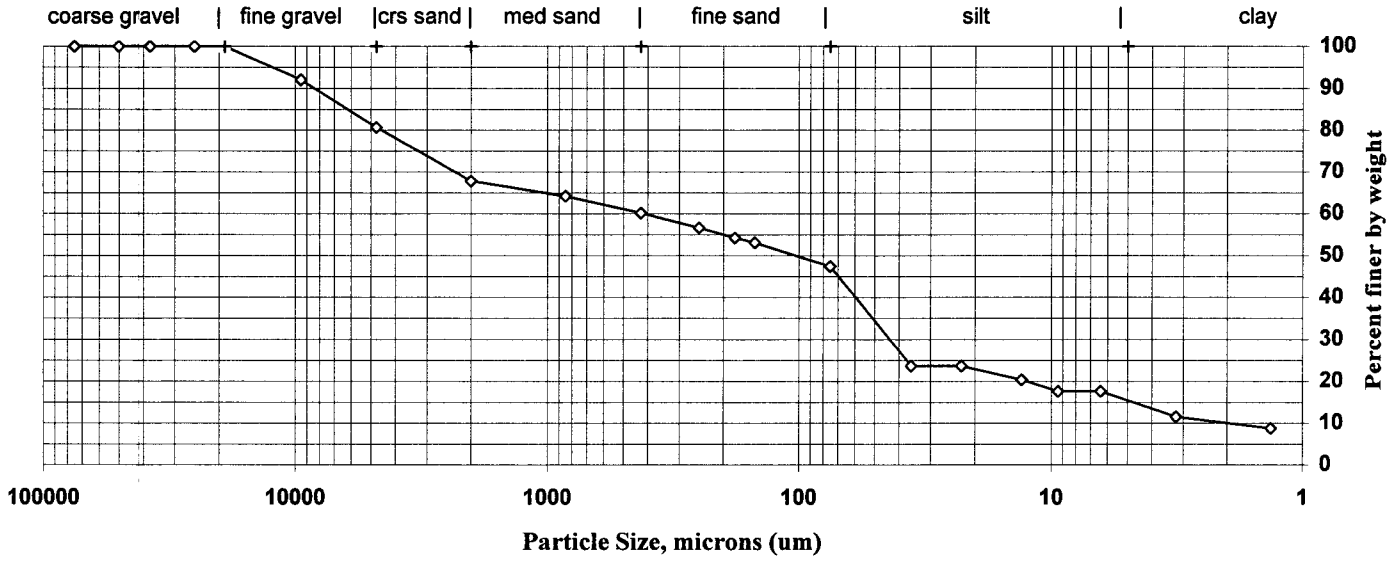
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535366 **Sample ID:** SSD52

Percent Solids:	26.6%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	7.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	92.1	7.9
#4	4750	80.7	11.4
#10	2000	67.8	12.8
#20	850	64.2	3.6
#40	425	60.2	4.0
#60	250	56.6	3.6
#80	180	54.2	2.4
#100	150	53.0	1.2
#200	75	47.4	5.6
Hydrometer	35.7	23.7	23.7
|	22.6	23.7	0.0
|	13.1	20.4	3.3
|	9.4	17.6	2.8
|	6.4	17.6	0.0
|	3.2	11.6	6.1
V	1.3	8.8	2.8

Soil Classification	Percent of Total Sample
Gravel	19.3
Sand	33.3
Coarse Sand	12.8
Medium Sand	7.6
Fine Sand	12.8
Silt	29.8
Clay	17.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

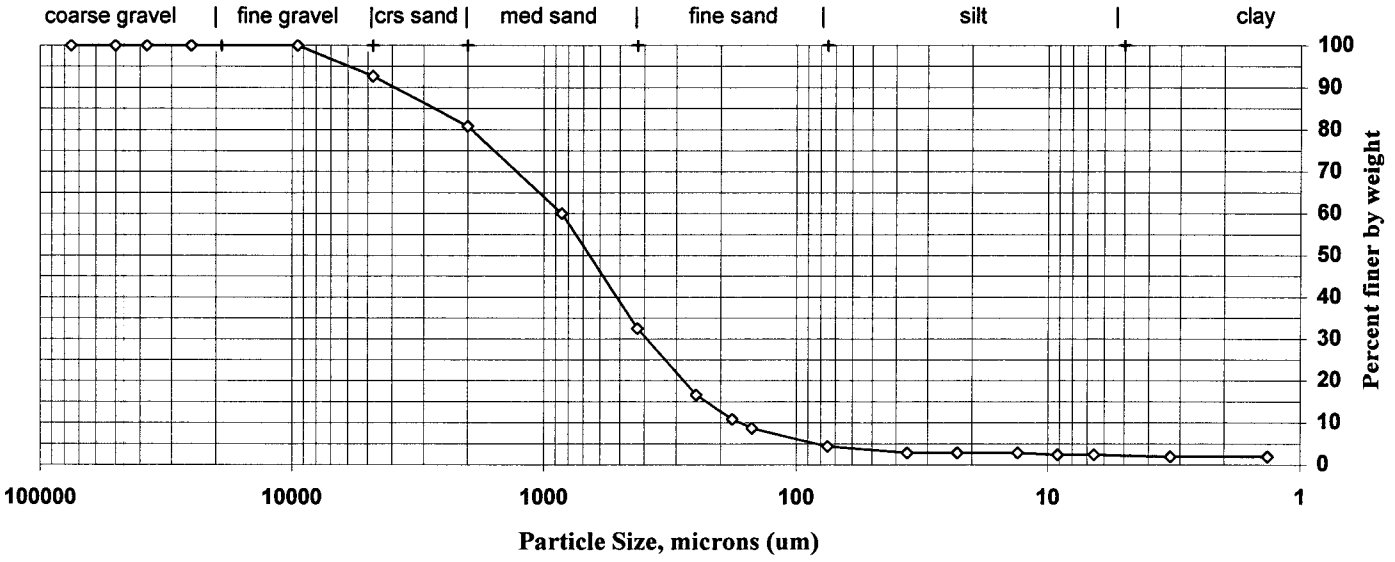
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535367 **Sample ID:** RSD54

Percent Solids:	81.2%		**Maximum Particle Size:**	9.5 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	92.6	7.4
#10	2000	80.8	11.8
#20	850	60.0	20.8
#40	425	32.5	27.5
#60	250	16.6	15.9
#80	180	10.9	5.7
#100	150	8.8	2.1
#200	75	4.4	4.4
Hydrometer	36.0	2.8	1.5
|	22.8	2.8	0.0
|	13.2	2.8	0.0
|	9.1	2.4	0.5
|	6.6	2.4	0.0
|	3.3	1.9	0.5
V	1.3	1.9	0.0

Soil Classification	Percent of Total Sample
Gravel	7.4
Sand	88.3
Coarse Sand	11.8
Medium Sand	48.3
Fine Sand	28.1
Silt	2.0
Clay	2.4

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

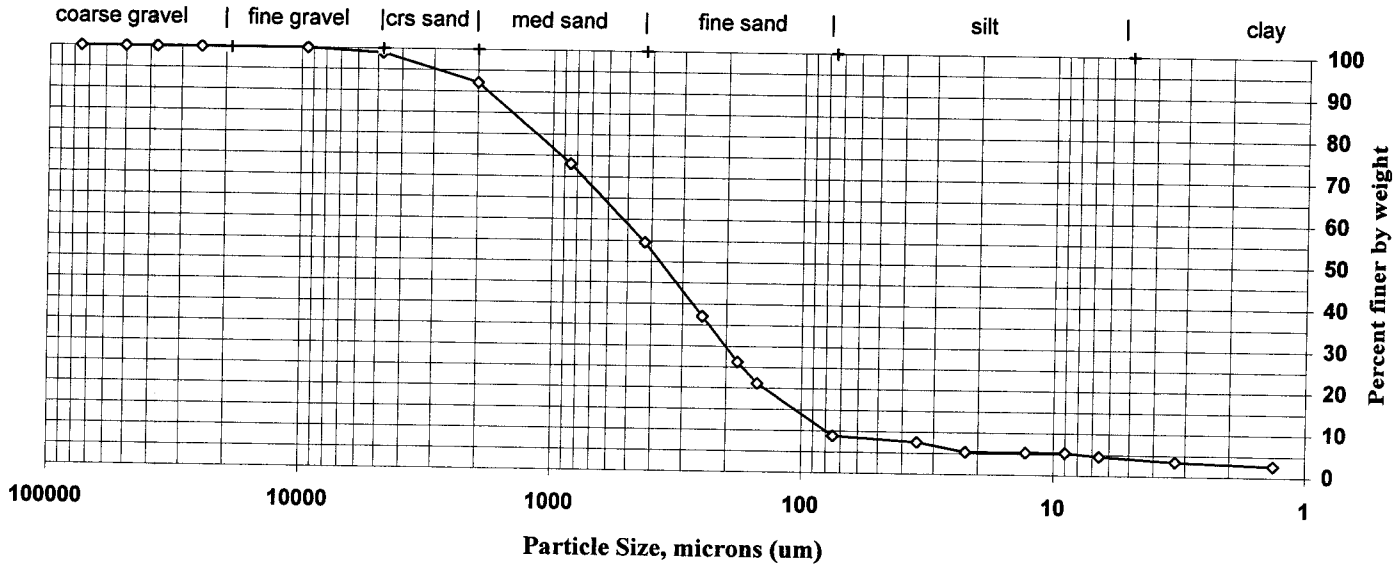
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535368 **Sample ID:** PSD54

Percent Solids:	70.4%		**Maximum Particle Size:**	9.5 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	98.9	1.1
#10	2000	92.1	6.9
#20	850	73.0	19.1
#40	425	54.6	18.4
#60	250	37.1	17.5
#80	180	26.2	10.9
#100	150	21.2	5.0
#200	75	8.9	12.3
Hydrometer	35.0	7.5	1.4
|	22.4	5.4	2.2
|	13.0	5.4	0.0
|	9.0	5.4	0.0
|	6.6	4.6	0.7
|	3.3	3.4	1.2
V	1.3	2.7	0.7

Soil Classification	Percent of Total Sample
Gravel	1.1
Sand	90.0
Coarse Sand	6.9
Medium Sand	37.5
Fine Sand	45.7
Silt	4.3
Clay	4.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

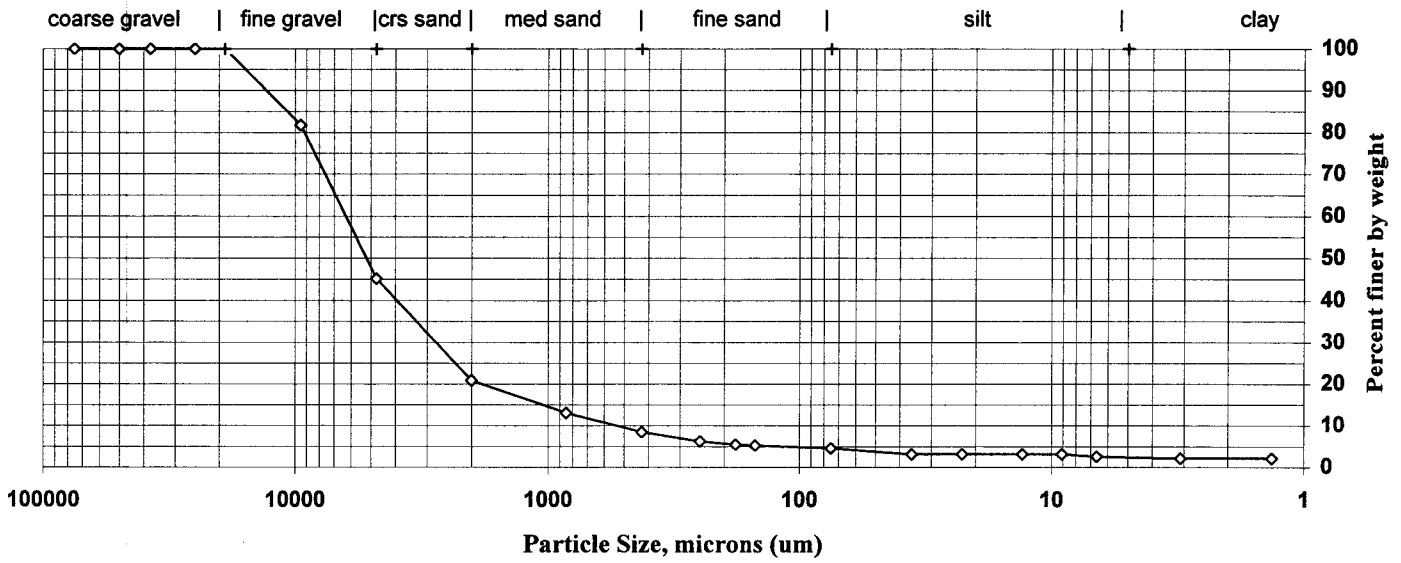
Particle Size of Soils by ASTM D422

Sample preparation method: D2217

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535369 **Sample ID:** PSD03

Percent Solids:	87.1%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	81.7	18.3
#4	4750	45.2	36.5
#10	2000	20.8	24.3
#20	850	13.1	7.8
#40	425	8.5	4.6
#60	250	6.3	2.2
#80	180	5.5	0.8
#100	150	5.3	0.3
#200	75	4.6	0.6
Hydrometer	35.8	3.2	1.5
|	22.6	3.2	0.0
|	13.1	3.2	0.0
|	9.1	3.2	0.0
|	6.6	2.6	0.6
|	3.1	2.2	0.4
V	1.3	2.2	0.0

Soil Classification	Percent of Total Sample
Gravel	54.8
Sand	40.6
Coarse Sand	24.3
Medium Sand	12.4
Fine Sand	3.8
Silt	2.0
Clay	2.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

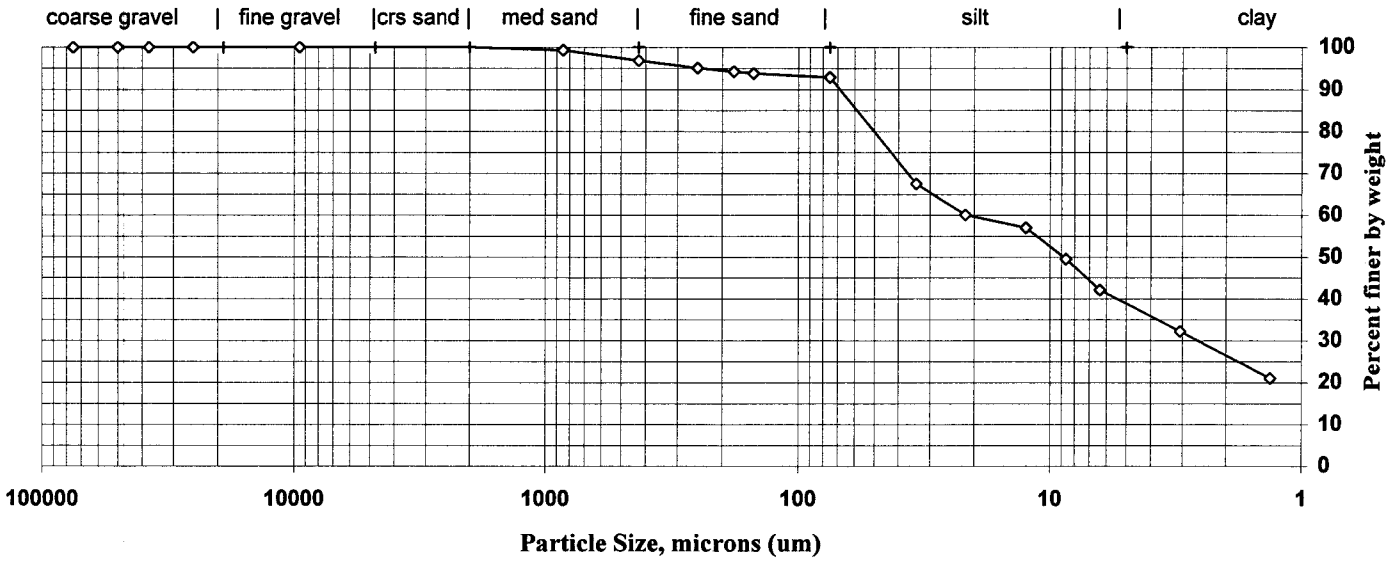
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535370 **Sample ID:** SSD11

Percent Solids:	21.9%		**Maximum Particle Size:**	Med sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	N/A	
Non-soil mass:	0.3%		**Hardness (> #10):**	N/A	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.3	0.7
#40	425	96.9	2.5
#60	250	95.1	1.7
#80	180	94.3	0.9
#100	150	93.8	0.4
#200	75	92.9	0.9
Hydrometer	33.9	67.5	25.4
|	21.7	60.1	7.4
|	12.5	57.0	3.1
|	8.6	49.6	7.4
|	6.4	42.1	7.4
|	3.1	32.2	9.9
V	1.3	21.1	11.2

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	7.1
Coarse Sand	0.0
Medium Sand	3.1
Fine Sand	3.9
Silt	50.8
Clay	42.1

Dispersion Device: Mechanical mixer with a metal paddle.

Dispersion Period: 1 minute

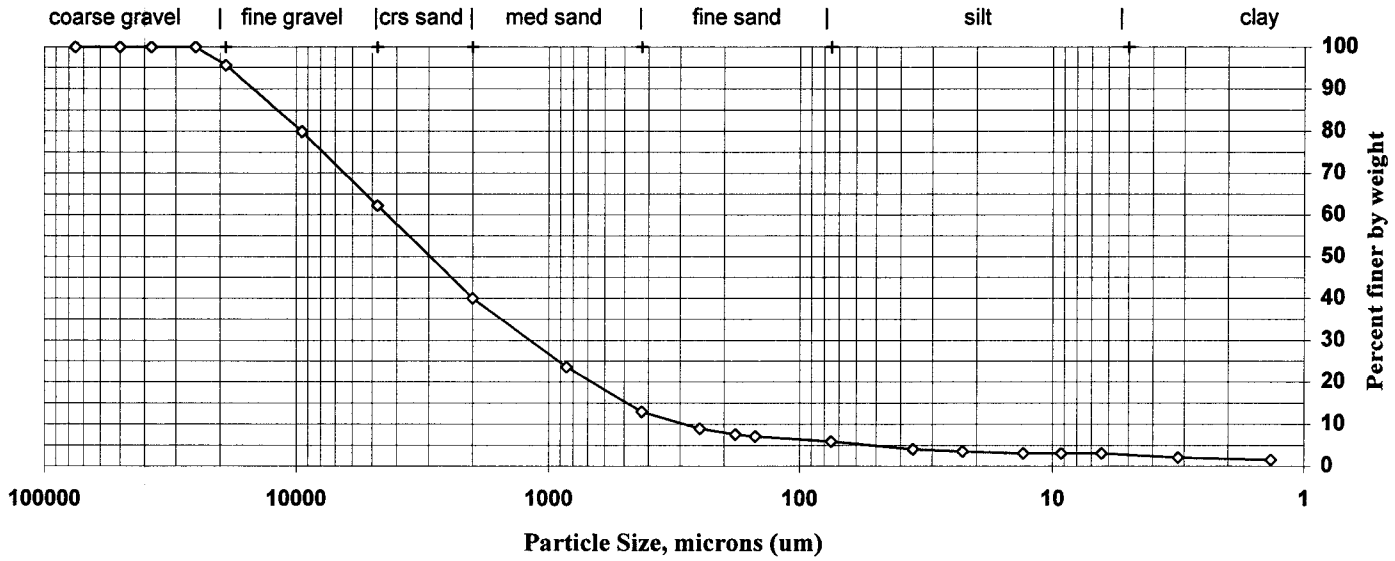
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535371 **Sample ID:** PSD02

Percent Solids:	81.2%		**Maximum Particle Size:**	25 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	95.5	4.5
3/8 inch	9500	79.9	15.6
#4	4750	62.2	17.7
#10	2000	40.0	22.2
#20	850	23.5	16.5
#40	425	12.9	10.6
#60	250	9.0	4.0
#80	180	7.6	1.4
#100	150	7.1	0.5
#200	75	5.9	1.2
Hydrometer	35.7	4.1	1.9
|	22.7	3.5	0.6
|	13.1	3.0	0.5
|	9.2	3.0	0.0
|	6.4	3.0	0.0
|	3.2	2.1	0.9
V	1.4	1.5	0.6

Soil Classification	Percent of Total Sample
Gravel	37.8
Sand	56.3
Coarse Sand	22.2
Medium Sand	27.1
Fine Sand	7.0
Silt	2.9
Clay	3.0

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

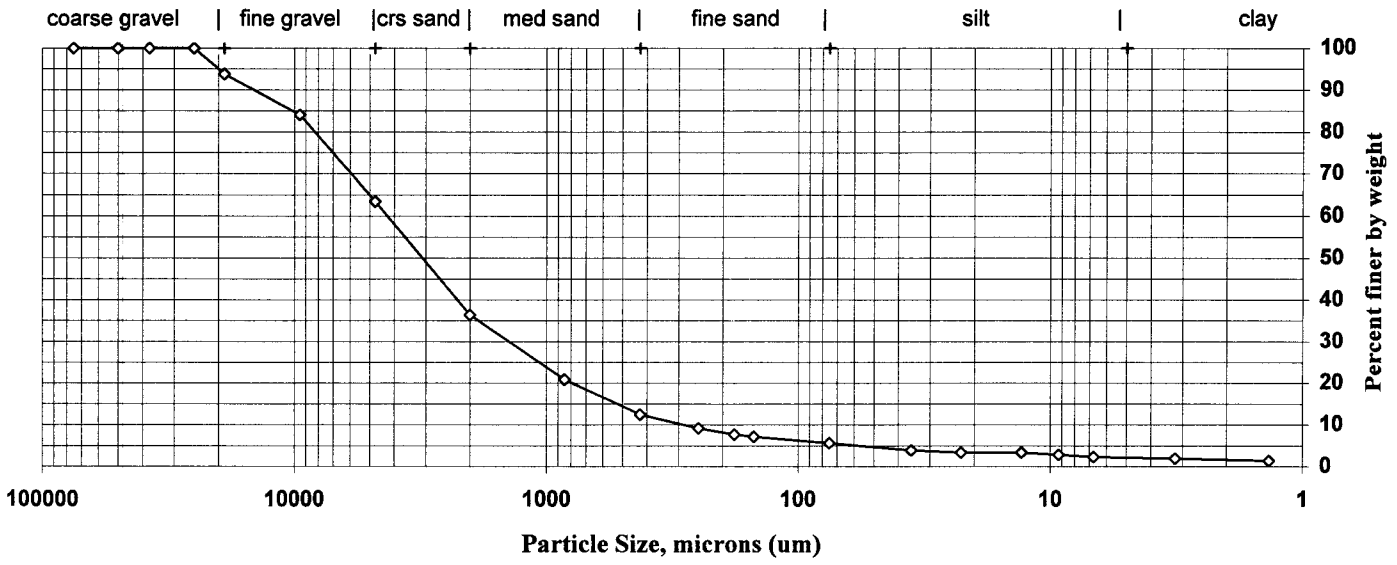
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535372 **Sample ID:** PSD01

Percent Solids:	78.0%		**Maximum Particle Size:**	25 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	93.8	6.2
3/8 inch	9500	84.0	9.8
#4	4750	63.4	20.6
#10	2000	36.4	27.0
#20	850	20.9	15.5
#40	425	12.5	8.4
#60	250	9.2	3.3
#80	180	7.7	1.4
#100	150	7.2	0.5
#200	75	5.7	1.5
Hydrometer	35.5	3.9	1.8
|	22.5	3.4	0.5
|	13.0	3.4	0.0
|	9.2	2.8	0.5
|	6.7	2.3	0.5
|	3.2	1.9	0.4
V	1.4	1.4	0.5

Soil Classification	Percent of Total Sample
Gravel	36.6
Sand	57.7
Coarse Sand	27.0
Medium Sand	23.9
Fine Sand	6.8
Silt	3.4
Clay	2.3

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

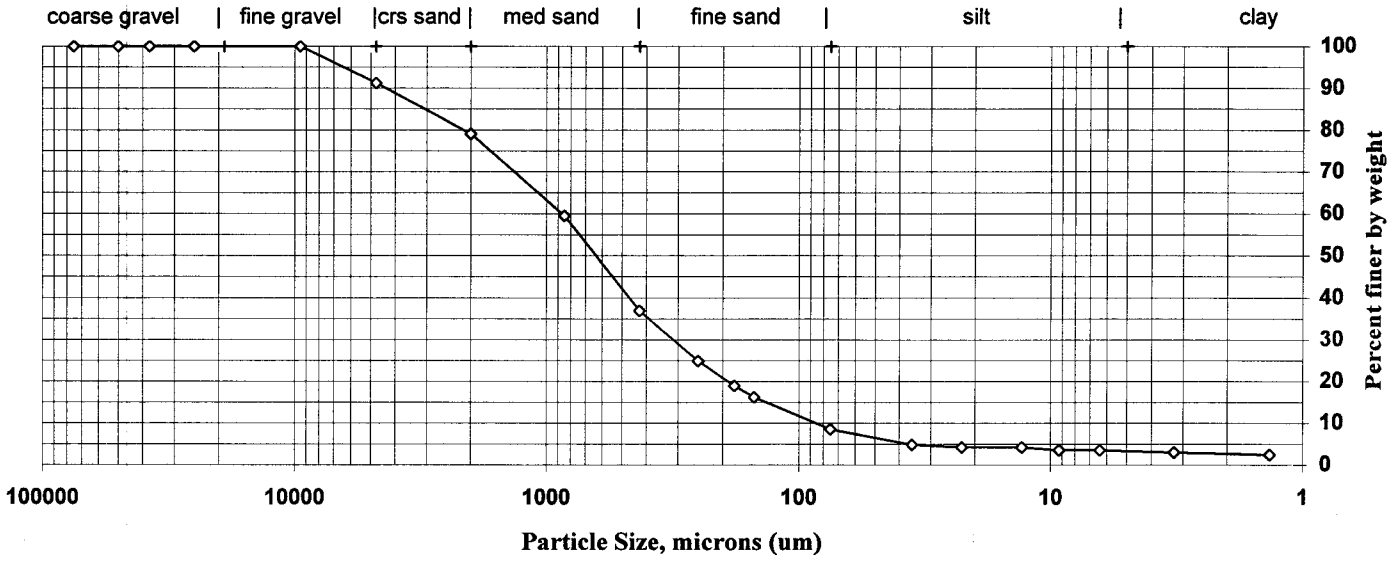
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535373 **Sample ID:** PSD53

Percent Solids:	81.1%		**Maximum Particle Size:**	9.5 mm
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular
Non-soil mass:	0.1%		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	91.2	8.8
#10	2000	79.0	12.2
#20	850	59.4	19.6
#40	425	36.9	22.5
#60	250	24.9	12.0
#80	180	19.0	5.9
#100	150	16.2	2.8
#200	75	8.6	7.6
Hydrometer	35.5	4.8	3.8
|	22.5	4.2	0.7
|	13.0	4.2	0.0
|	9.2	3.5	0.7
|	6.4	3.5	0.0
|	3.3	3.0	0.5
V	1.4	2.4	0.5

Soil Classification	Percent of Total Sample
Gravel	8.8
Sand	82.6
Coarse Sand	12.2
Medium Sand	42.1
Fine Sand	28.3
Silt	5.1
Clay	3.5

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

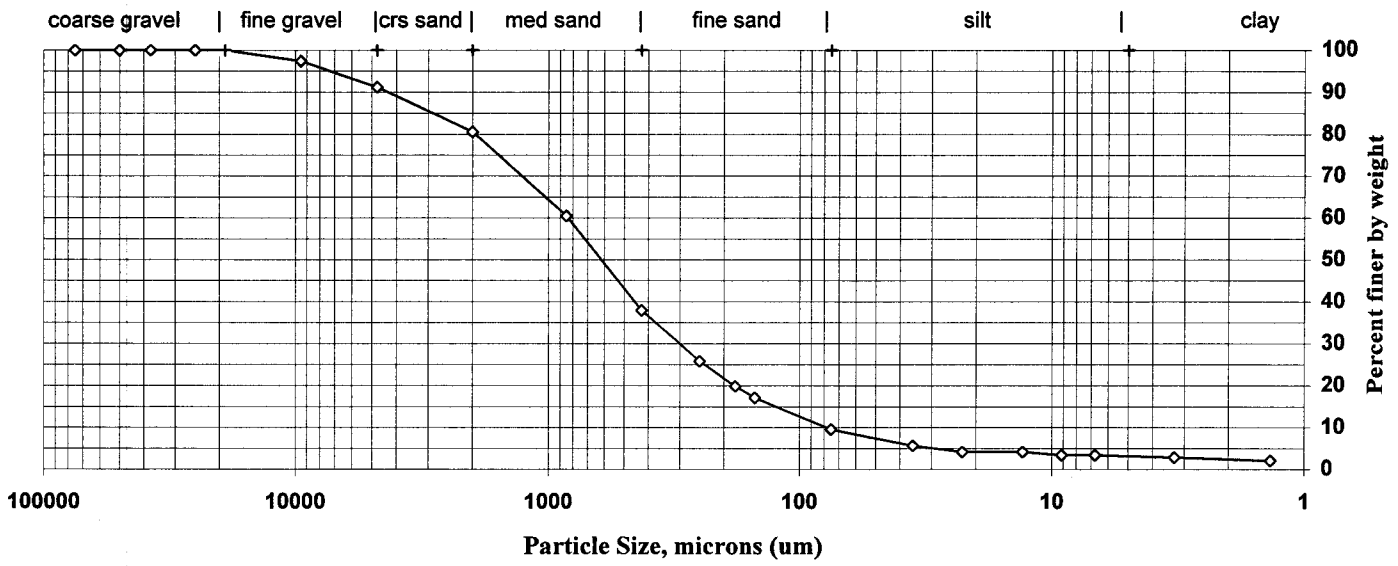
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535373DP **Sample ID:** PSD53REP

Percent Solids:	82.1%		**Maximum Particle Size:**	19 mm
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular
Non-soil mass:	0.0%		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.4	2.6
#4	4750	91.2	6.2
#10	2000	80.6	10.6
#20	850	60.5	20.1
#40	425	38.0	22.6
#60	250	25.8	12.1
#80	180	19.9	6.0
#100	150	17.2	2.7
#200	75	9.6	7.6
Hydrometer	35.5	5.6	3.9
|	22.6	4.1	1.5
|	13.1	4.1	0.0
|	9.1	3.3	0.8
|	6.7	3.3	0.0
|	3.3	2.8	0.5
V	1.4	2.1	0.8

Soil Classification	Percent of Total Sample
Gravel	8.8
Sand	81.6
Coarse Sand	10.6
Medium Sand	42.6
Fine Sand	28.4
Silt	6.2
Clay	3.3

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

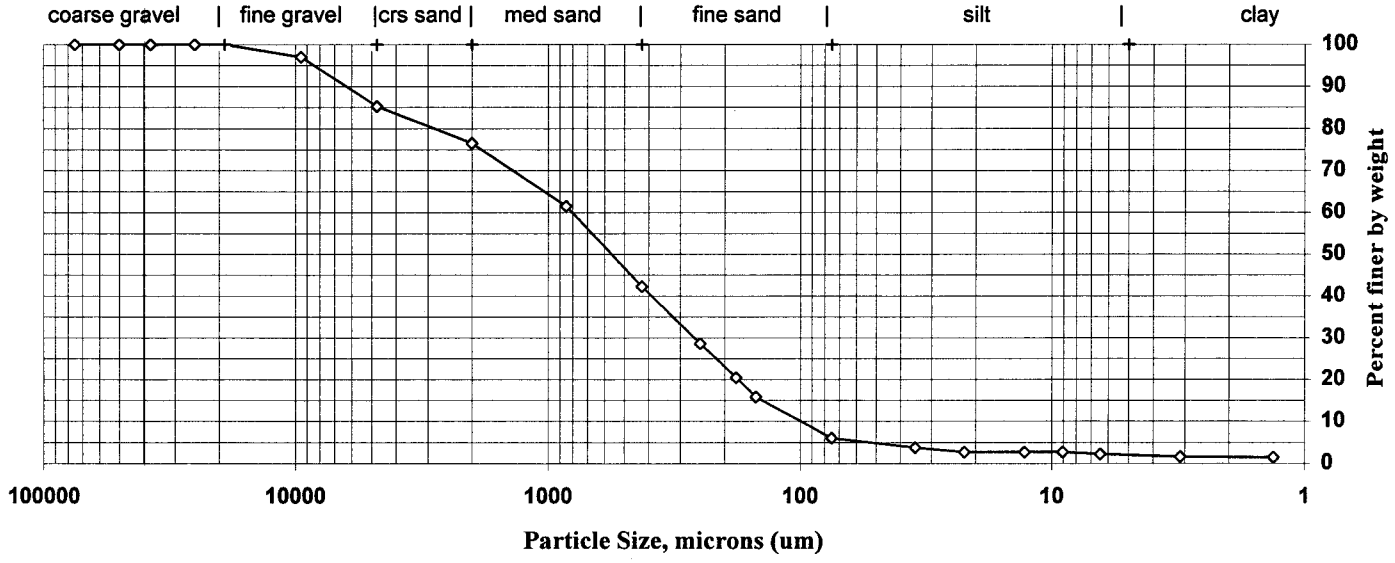
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	94941
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	22-Jul-03	**Start Date:**	04-Aug-03	**End Date:**	15-Aug-03

Lab ID: 535374 **Sample ID:** RSD53

Percent Solids:	76.3%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular	
Non-soil mass:	0.3%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	97.0	3.0
#4	4750	85.3	11.7
#10	2000	76.5	8.7
#20	850	61.5	15.0
#40	425	42.3	19.3
#60	250	28.6	13.7
#80	180	20.5	8.1
#100	150	15.8	4.7
#200	75	6.0	9.8
Hydrometer	34.7	3.8	2.3
|	22.2	2.7	1.1
|	12.8	2.7	0.0
|	9.1	2.7	0.0
|	6.4	2.2	0.5
|	3.1	1.6	0.6
V	1.3	1.5	0.1

Soil Classification	Percent of Total Sample
Gravel	14.7
Sand	79.2
Coarse Sand	8.7
Medium Sand	34.2
Fine Sand	36.2
Silt	3.8
Clay	2.2

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

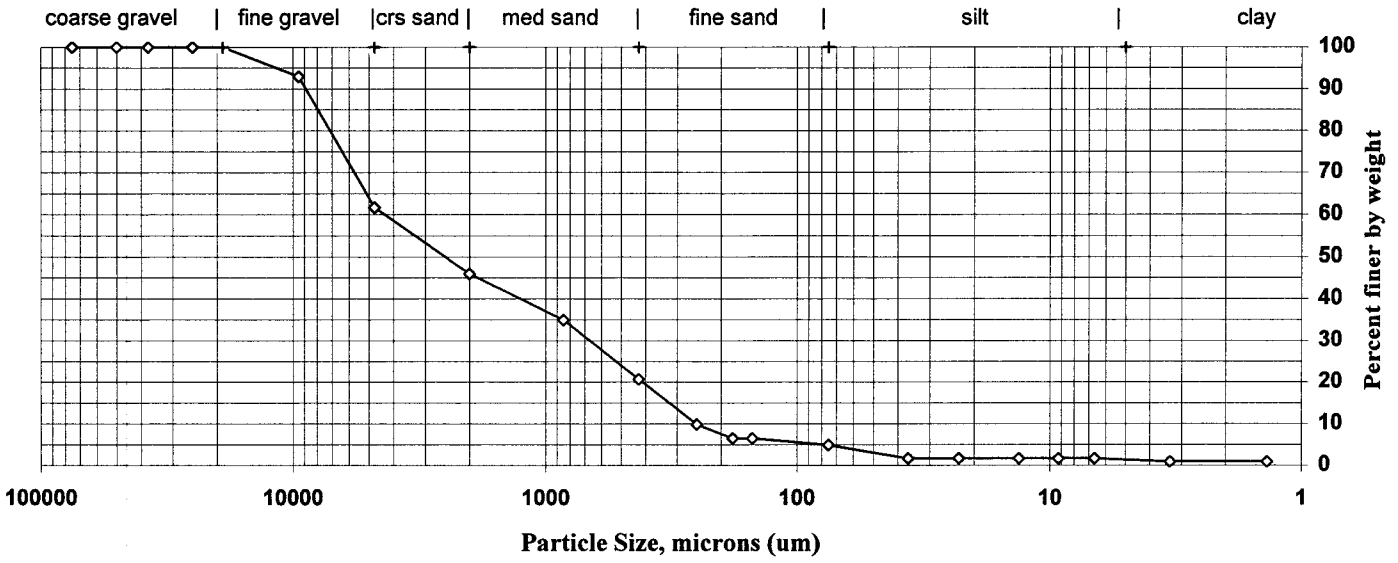
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95000
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	24-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 535813 **Sample ID:** SD05

Percent Solids:	82.4%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	93.0	7.0
#4	4750	61.7	31.3
#10	2000	45.9	15.8
#20	850	35.0	10.9
#40	425	20.7	14.2
#60	250	9.8	10.9
#80	180	6.5	3.3
#100	150	6.5	0.0
#200	75	4.9	1.6
Hydrometer	36.3	1.7	3.2
|	23.0	1.7	0.0
|	13.3	1.7	0.0
|	9.2	1.7	0.0
|	6.6	1.7	0.0
|	3.3	0.9	0.8
V	1.4	0.9	0.0

Soil Classification	Percent of Total Sample
Gravel	38.3
Sand	56.8
Coarse Sand	15.8
Medium Sand	25.2
Fine Sand	15.8
Silt	3.2
Clay	1.7

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

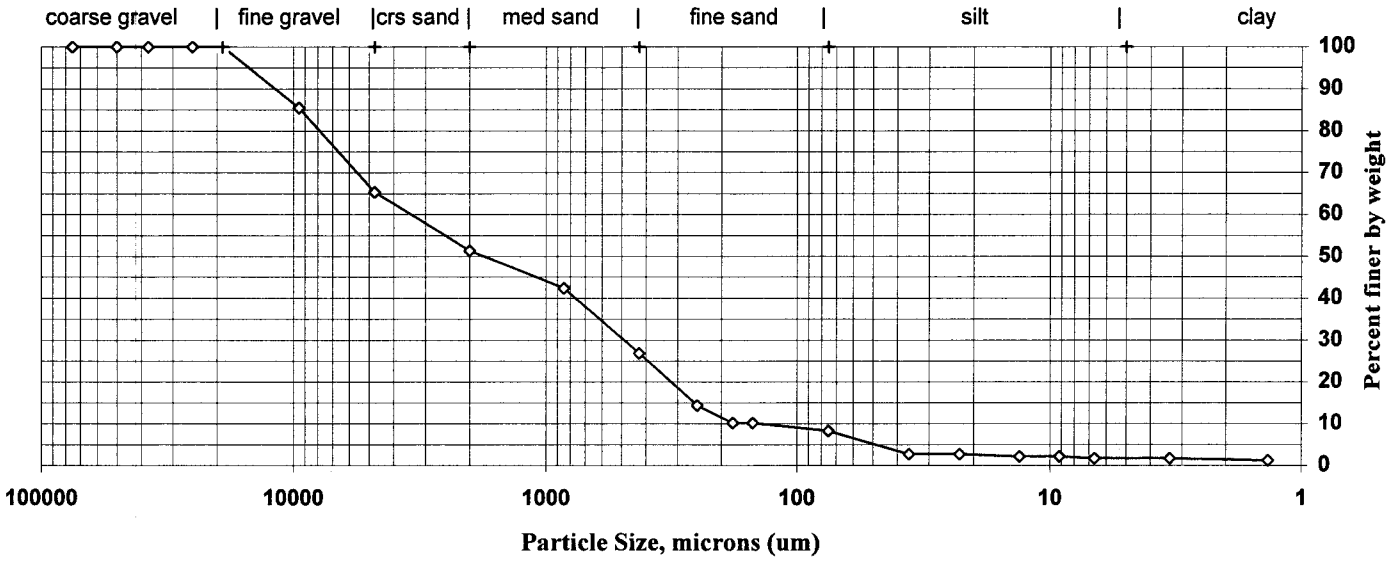
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95000
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	24-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 535814 **Sample ID:** SD05100

Percent Solids:	85.1%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	85.4	14.6
#4	4750	65.3	20.1
#10	2000	51.4	13.9
#20	850	42.4	9.0
#40	425	26.9	15.4
#60	250	14.4	12.5
#80	180	10.2	4.2
#100	150	10.2	0.0
#200	75	8.2	2.0
Hydrometer	35.9	2.7	5.5
|	22.7	2.7	0.0
|	13.2	2.2	0.5
|	9.2	2.2	0.0
|	6.7	1.6	0.5
|	3.3	1.6	0.0
V	1.4	1.2	0.4

Soil Classification	Percent of Total Sample
Gravel	34.7
Sand	57.1
Coarse Sand	13.9
Medium Sand	24.5
Fine Sand	18.7
Silt	6.6
Clay	1.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

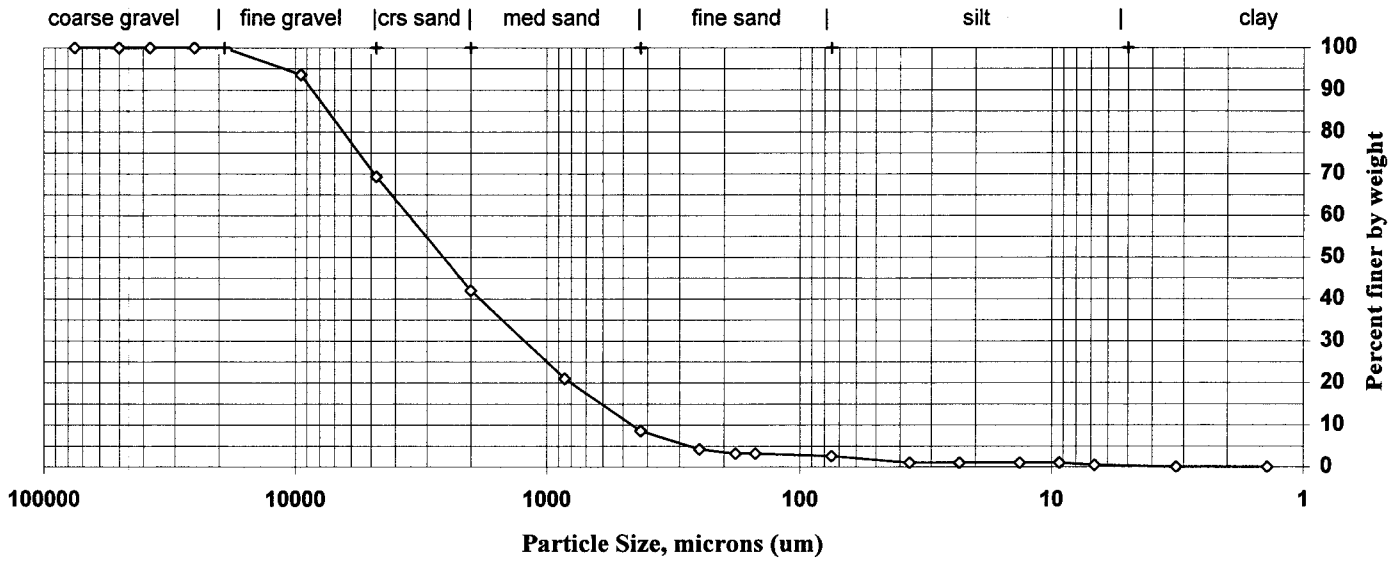
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95000
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	24-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 535815 **Sample ID:** SD06

Percent Solids:	84.7%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	93.6	6.4
#4	4750	69.4	24.2
#10	2000	42.0	27.3
#20	850	21.0	21.0
#40	425	8.7	12.4
#60	250	4.3	4.4
#80	180	3.2	1.0
#100	150	3.2	0.0
#200	75	2.6	0.6
Hydrometer	36.6	1.0	1.7
|	23.1	1.0	0.0
|	13.4	1.0	0.0
|	9.3	1.0	0.0
|	6.8	0.5	0.5
|	3.2	0.0	0.5
V	1.4	0.0	0.0

Soil Classification	Percent of Total Sample
Gravel	30.6
Sand	66.7
Coarse Sand	27.3
Medium Sand	33.4
Fine Sand	6.0
Silt	2.1
Clay	0.5

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

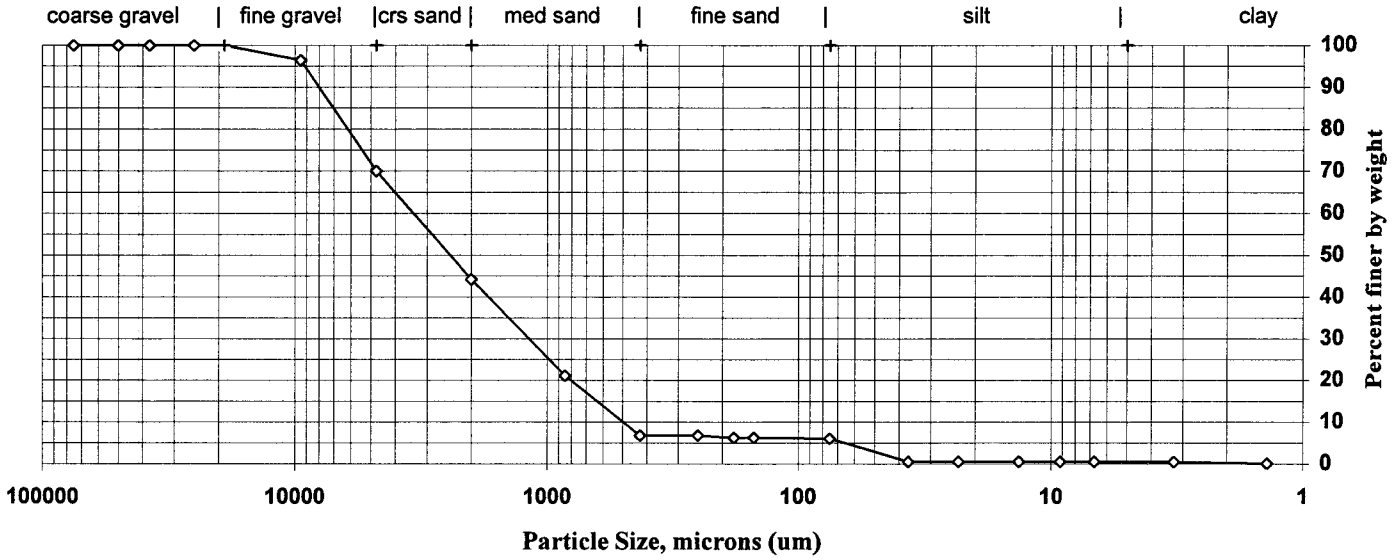
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95000
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	24-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 535816 **Sample ID:** SD08

Percent Solids:	82.1%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.4	3.6
#4	4750	70.0	26.4
#10	2000	44.2	25.8
#20	850	21.1	23.1
#40	425	6.8	14.3
#60	250	6.8	0.0
#80	180	6.3	0.5
#100	150	6.3	0.0
#200	75	6.0	0.3
Hydrometer	36.7	0.6	5.5
|	23.2	0.6	0.0
|	13.4	0.6	0.0
|	9.2	0.6	0.0
|	6.7	0.6	0.0
|	3.3	0.5	0.1
V	1.4	0.1	0.4

Soil Classification	Percent of Total Sample
Gravel	30.0
Sand	64.0
Coarse Sand	25.8
Medium Sand	37.4
Fine Sand	0.8
Silt	5.5
Clay	0.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

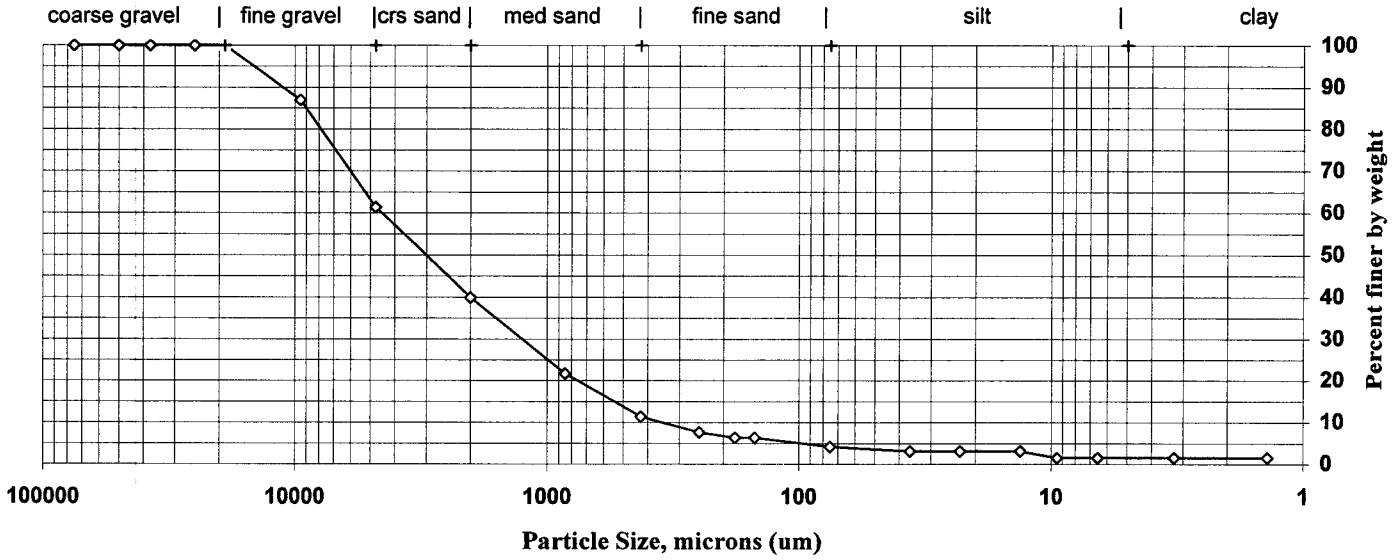
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95000
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD002
Date Received:	24-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 535818 **Sample ID:** SD07

Percent Solids:	78.5%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	0.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	86.9	13.1
#4	4750	61.4	25.5
#10	2000	39.9	21.5
#20	850	21.7	18.2
#40	425	11.4	10.3
#60	250	7.6	3.8
#80	180	6.3	1.3
#100	150	6.3	0.0
#200	75	4.2	2.1
Hydrometer	36.3	3.1	1.1
|	22.9	3.1	0.0
|	13.2	3.1	0.0
|	9.4	1.6	1.6
|	6.5	1.6	0.0
|	3.3	1.6	0.0
V	1.4	1.6	0.0

Soil Classification	Percent of Total Sample
Gravel	38.6
Sand	57.2
Coarse Sand	21.5
Medium Sand	28.5
Fine Sand	7.2
Silt	2.7
Clay	1.6

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

STL Burlington
Colchester, Vermont

Sample Data Summary Package

SDG: GCD003

SEVERN TRENT STL

September 17, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCD003

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 26, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/26/03 ETR No: 95020		
536011	BLACSTRSD42	07/22/03	Sediment
536012	BLACPDSSD41	07/22/03	Sediment
536013	BLACSTPSD01	07/23/03	Sediment
536013MS	BLACSTPSD01MS	07/23/03	Sediment
536013DP	BLACSTPSD01REP	07/23/03	Sediment
536014	BLACADSSD11	07/23/03	Sediment
536015	BLACPDSSD43	07/23/03	Sediment
536016	BLACSTPSD02	07/23/03	Sediment
536017	BLACSTPSD42	07/22/03	Sediment
536018	BLACSTRSD02	07/22/03	Sediment
536019	BLACSTPSD03	07/22/03	Sediment
536020	BLUEPDSSD16	07/22/03	Sediment
536021	BLACPDSSD10	07/22/03	Sediment
536022	BLACSTPSD04	07/22/03	Sediment
536023	BLACSTRSD04	07/22/03	Sediment

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample login is included in the Sample Handling section of this submittal.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-

of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Metals by 6010B:
The relative percent differences (RPDs) between the initial and duplicate analysis of sample BLACSTPSD01 for aluminum (34.8%), arsenic (57.6%), calcium (26.0%), chromium (51.6%), lead (22.0%), magnesium (77.8%) and vanadium (25.4%) were above the established control limit of ±20 percent. Corresponding sample results have been flagged with a "*" to denote this anomaly.

The recoveries of the following metals from the laboratory fortified aliquot of sample BLACSTPSD01 were outside of the laboratory established control limits of 75-125 percent: antimony (65.0%), nickel (142.3%) and selenium (56.6%). Sample results have been flagged with an "N" accordingly.

The following samples displayed a severe (greater negative than –20 ppb) for thallium: BLACPDSSD41 and BLUEPDSSD16. BLUEPDSSD16 also displayed a negative interference (-15.45 ppb) for silver.

Please note that due to a log-in error, all samples in this delivery group were analyzed for mercury outside of holding time. The client will not be charged for these analyses.

Total Organic Carbon by Lloyd Kahn:
The duplicate analysis of the sample designated BLACSTPSD01 yielded a relative percent difference of 45.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0360.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The Laboratory Director or his designee, as verified by the following signature, has authorized the release of the data contained in this hardcopy data package.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

0001-B Last Alpha

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Sediment 1 of 1

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200
Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Sampler's Name: Jen Kindred, Don Norman
Sampler's Signature: Jen Kindred, Don Norman

Proj. No.: 13890.16
Project Name: Granite Creek watershed

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2]: VOA	A/G 1 Lt.	250 ml	P/O	TOC	TAL metals	Cyanides	Grain size	Lab/Sample ID (Lab Use Only)
SD	7/22/03	1200		X	BLAC-ST-RSD-42			2		X	X	X	X	
SD	7/22	1650		X	BLAC-PD-SSD-41			2		X	X	X	X	
SD	7/23	1115		X	BLAC-ST-PSD-01 MS			4 (4u) 2		X	X	X	X	
SD	7/23	1330		X	BLAC-AD-SSD-11			2		X	X	X	X	
SD	7/23	1430		X	BLAC-PD-SSD-43			2		X	X	X	X	
SD	7/22	1815		X	BLAC-ST-PSD-02			2		X	X	X	X	
SD	7/22	1230		X	BLAC-ST-PSD-42			2		X	X	X	X	
SD	7/22	1830		X	BLAC-ST-RSD-02			2		X	X	X	X	
SD	7/22	1800		X	BLAC-ST-PSD-03			2		X	X	X	X	
SD	7/22	1620		X	BLWE-PD-SSD-16			2		X	X	X	X	

year = 03

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
			Jennifer Levy	07/26/03	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time

Remarks
* Grain size collected at 1655.
** MS for TOC, TAL + CN only.

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____
SD = Sediment

STL cannot accept verbal changes.
Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Sediment 2 of 2

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: Same
Address: 12011 Bel-Red Rd Suite 200 Bellevue, WA 98005	Address:
Contact: J Kindred	Contact:
Phone: 425-451-7400	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Sampler's Name: Don Norman

Sampler's Signature: Don Norman

Proj. No.: 13890.16

Project Name: Granite Cr Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TOC	TAL Metals	Cyanide	Gram Size	Lab/Sample ID (Lab Use Only)
SD	7/22	1730		X	BLAC-PD-SSD-10			2		X	X	X	X	
SD	7/22	1015		X	BLAC-ST-PSD-04			2		X	X	X	X	
SD	7/22	1035		X	BLAC-ST-RSD-04			2		X	X	X	X	

Year = 03

Analysis Requested

Lab Use Only
Due Date:

Temp. of coolers when received (C°):

1	2	3	4	5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
			Jennifer Lacey	7/24/03	1045
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

SD = Sediment

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTRSD42

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536011

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 72.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		72.5	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	138	1310	

Printed on: 09/16/03 10:06 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACPDSSD41

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536012

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 22.7

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		22.7	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	441	3680	

Printed on: 09/16/03 10:07 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTPSD01

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536013

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 77.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		77.9	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	129	1490	

Printed on: 09/16/03 10:07 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACADSSD11

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536014

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 8.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		8.5	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	1180	40700	

Printed on: 09/16/03 10:09 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACPDSSD43

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536015

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 71.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		71.5	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	140	32700	

Printed on: 09/16/03 10:09 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTPSD02

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536016

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 70.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		70.9	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	142	557	

Printed on: 09/16/03 10:09 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTPSD42

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536017

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 19.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		19.2	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	521	111800	

Printed on: 09/16/03 10:10 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLACSTRSD02

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCD003

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 536018

Matrix: SEDIMENT
Client: EASEAT
Date Received: 07/26/03

% Solids: 77.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		77.4	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	130	4610	

Printed on: 09/16/03 10:10 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTPSD03

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536019

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 79.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		79.6	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	126	1330	

Printed on: 09/16/03 10:11 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSSD16

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536020

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 13.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		13.5	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	741	18100	

Printed on: 09/16/03 10:11 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACPDSSD10

Lab Name: STL BURLINGTON

Contract: LSO1024805

SDG No.: GCD003

Lab Code: STLVT

Case No.: 23046

Lab Sample ID: 536021

Matrix: SEDIMENT

Client: EASEAT

Date Received: 07/26/03

% Solids: 16.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		16.9	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	592	9960	

Printed on: 09/16/03 10:12 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTPSD04

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536022

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 74.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		74.9	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	134	697	

Printed on: 09/16/03 10:12 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTRSD04

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536023

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 82.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		82.2	
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1	122	4090	

Printed on: 09/16/03 10:13 AM

WET CHEMISTRY

Method Blank Report Summary

Lab Name: STL BURLINGTON Contract: LSO1024805 SDG No.: GCD003

Lab Code: STLVT Case No.: 23046

Matrix: SOIL Client: EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Conc.	Units	Qual.	DF	RL	Analytical Run Date	Analytical Batch
BLKLK0731A	IN847	TOC by Lloyd Kahn	100	mg/Kg	U	1	100	07/31/03	BLKLK0731A

Printed on: 09/16/03 10:14 AM

WET CHEMISTRY

Matrix Spike Sample Report Summary

Client Sample No.: BLACSTPSD01MS

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536013MS

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Matrix Spike Result Conc.	Qual.	Sample Result Conc.	Qual.	Spike Added	% Recovery*
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	167600		1490		184510.00	90.0

** Control Limit for Percent Recovery is 75-125%, unless otherwise specified.*

Printed on: 09/16/03 10:08 AM

WET CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.
BLACSTPSD01REP

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 536013DP

Matrix: SEDIMENT | Client: EASEAT | Date Received: 07/26/03

% Solids: 76.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Sample Result Qual.	Duplicate Sample Result Conc.	Duplicate Sample Result Qual.	RPD*
IN623	Solids, Percent	08/05/03	N/A	%	77.9		76.1		2
IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	1490		938		45

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/16/03 10:08 AM

WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCD003

Lab Code: STLVT | Case No.: 23046

Matrix: SOIL | Client: EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCSLK0731A	IN847	TOC by Lloyd Kahn	07/31/03	BLKLK0731A	mg/Kg	8880	8500.0000	104.5

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

Printed on: 09/16/03 10:16 AM

SEVERN TRENT STL

Sample Data Summary Package For Metals

USEPA - CLP FORMS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
BLACADSSD11	536014
BLACPDSSD10	536021
BLACPDSSD41	536012
BLACPDSSD43	536015
BLACSTPSD01	536013
BLACSTPSD01D	536013DP
BLACSTPSD01S	536013MS
BLACSTPSD02	536016
BLACSTPSD03	536019
BLACSTPSD04	536022
BLACSTPSD42	536017
BLACSTRSD02	536018
BLACSTRSD04	536023
BLACSTRSD42	536011
BLUEPDSSD16	536020

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACADSSD11

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536014

Level (low/med): LOW Date Received: 07/26/03

% Solids: 8.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1720		*	P
7440-36-0	Antimony	9.7	B	N	P
7440-38-2	Arsenic	34.0		*	P
7440-39-3	Barium	227			P
7440-41-7	Beryllium	4.2	B		P
7440-43-9	Cadmium	5.1	B		P
7440-70-2	Calcium	1250	B	*	P
7440-47-3	Chromium	1.6	U	*	P
7440-48-4	Cobalt	20.9	B		P
7440-50-8	Copper	81.9			P
7439-89-6	Iron	729000			P
7439-92-1	Lead	21.8		*	P
7439-95-4	Magnesium	457	B	*	P
7439-96-5	Manganese	982			P
7439-97-6	Mercury	0.57			CV
7440-02-0	Nickel	159		N	P
7440-09-7	Potassium	440	U		P
7782-49-2	Selenium	3.8	U	N	P
7440-22-4	Silver	2.5	U		P
7440-23-5	Sodium	690	B		P
7440-28-0	Thallium	35.5			P
7440-62-2	Vanadium	4.8	B	*	P
7440-66-6	Zinc	2230			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACPDSSD10

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536021

Level (low/med): LOW Date Received: 07/26/03

% Solids: 16.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15300		*	P
7440-36-0	Antimony	7.4	B	N	P
7440-38-2	Arsenic	136		*	P
7440-39-3	Barium	9.1	B		P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	108	U	*	P
7440-47-3	Chromium	31.8		*	P
7440-48-4	Cobalt	1.2	U		P
7440-50-8	Copper	1280			P
7439-89-6	Iron	531000			P
7439-92-1	Lead	19.4		*	P
7439-95-4	Magnesium	106	U	*	P
7439-96-5	Manganese	110			P
7439-97-6	Mercury	1.4			CV
7440-02-0	Nickel	1.2	U	N	P
7440-09-7	Potassium	233	U		P
7782-49-2	Selenium	2.0	U	N	P
7440-22-4	Silver	1.3	U		P
7440-23-5	Sodium	280	U		P
7440-28-0	Thallium	22.3			P
7440-62-2	Vanadium	16.2	B	*	P
7440-66-6	Zinc	75.4			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACPDSSD41

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536012

Level (low/med): LOW Date Received: 07/26/03

% Solids: 22.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	40900		*	P
7440-36-0	Antimony	2.9	B	N	P
7440-38-2	Arsenic	110		*	P
7440-39-3	Barium	837			P
7440-41-7	Beryllium	1.6	B		P
7440-43-9	Cadmium	21.2			P
7440-70-2	Calcium	6880		*	P
7440-47-3	Chromium	144		*	P
7440-48-4	Cobalt	283			P
7440-50-8	Copper	1080			P
7439-89-6	Iron	70000			P
7439-92-1	Lead	11.8		*	P
7439-95-4	Magnesium	15400		*	P
7439-96-5	Manganese	32600			P
7439-97-6	Mercury	0.25			CV
7440-02-0	Nickel	1810		N	P
7440-09-7	Potassium	2400			P
7782-49-2	Selenium	9.0		N	P
7440-22-4	Silver	0.97	U		P
7440-23-5	Sodium	463	B		P
7440-28-0	Thallium	2.5	U		P
7440-62-2	Vanadium	110		*	P
7440-66-6	Zinc	1310			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACPDSSD43

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536015

Level (low/med): LOW Date Received: 07/26/03

% Solids: 71.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1440		*	P
7440-36-0	Antimony	0.64	U	N	P
7440-38-2	Arsenic	0.81	B	*	P
7440-39-3	Barium	12.4	B		P
7440-41-7	Beryllium	0.15	B		P
7440-43-9	Cadmium	0.27	B		P
7440-70-2	Calcium	999		*	P
7440-47-3	Chromium	4.4		*	P
7440-48-4	Cobalt	6.0	B		P
7440-50-8	Copper	49.3			P
7439-89-6	Iron	4550			P
7439-92-1	Lead	2.4		*	P
7439-95-4	Magnesium	808		*	P
7439-96-5	Manganese	492			P
7439-97-6	Mercury	0.069			CV
7440-02-0	Nickel	72.9		N	P
7440-09-7	Potassium	160	B		P
7782-49-2	Selenium	0.47	U	N	P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	155	B		P
7440-28-0	Thallium	0.78	U		P
7440-62-2	Vanadium	2.9	B	*	P
7440-66-6	Zinc	60.9			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPSD01

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536013

Level (low/med): LOW Date Received: 07/26/03

% Solids: 77.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12400		*	P
7440-36-0	Antimony	2.1	B	N	P
7440-38-2	Arsenic	34.7		*	P
7440-39-3	Barium	67.5			P
7440-41-7	Beryllium	0.33	B		P
7440-43-9	Cadmium	0.33	B		P
7440-70-2	Calcium	3120		*	P
7440-47-3	Chromium	102		*	P
7440-48-4	Cobalt	20.0			P
7440-50-8	Copper	30.0			P
7439-89-6	Iron	30000			P
7439-92-1	Lead	3.3		*	P
7439-95-4	Magnesium	10400		*	P
7439-96-5	Manganese	543			P
7439-97-6	Mercury	0.019	U		CV
7440-02-0	Nickel	131		N	P
7440-09-7	Potassium	809			P
7782-49-2	Selenium	0.50	B	N	P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	277	B		P
7440-28-0	Thallium	0.71	U		P
7440-62-2	Vanadium	58.5		*	P
7440-66-6	Zinc	55.4			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPSD02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536016

Level (low/med): LOW Date Received: 07/26/03

% Solids: 70.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	17300		*	P
7440-36-0	Antimony	2.5	B	N	P
7440-38-2	Arsenic	52.6		*	P
7440-39-3	Barium	102			P
7440-41-7	Beryllium	0.40	B		P
7440-43-9	Cadmium	0.48	B		P
7440-70-2	Calcium	4170		*	P
7440-47-3	Chromium	193		*	P
7440-48-4	Cobalt	32.8			P
7440-50-8	Copper	37.2			P
7439-89-6	Iron	36600			P
7439-92-1	Lead	4.9		*	P
7439-95-4	Magnesium	21500		*	P
7439-96-5	Manganese	873			P
7439-97-6	Mercury	0.023	U		CV
7440-02-0	Nickel	224		N	P
7440-09-7	Potassium	904			P
7782-49-2	Selenium	0.68		N	P
7440-22-4	Silver	0.30	U		P
7440-23-5	Sodium	217	B		P
7440-28-0	Thallium	0.77	U		P
7440-62-2	Vanadium	71.9		*	P
7440-66-6	Zinc	66.8			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPSD03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536019

Level (low/med): LOW Date Received: 07/26/03

% Solids: 79.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12000		*	P
7440-36-0	Antimony	1.4	B	N	P
7440-38-2	Arsenic	19.2		*	P
7440-39-3	Barium	68.1			P
7440-41-7	Beryllium	0.28	B		P
7440-43-9	Cadmium	0.27	B		P
7440-70-2	Calcium	3170		*	P
7440-47-3	Chromium	122		*	P
7440-48-4	Cobalt	21.0			P
7440-50-8	Copper	38.9			P
7439-89-6	Iron	25900			P
7439-92-1	Lead	3.2		*	P
7439-95-4	Magnesium	15200		*	P
7439-96-5	Manganese	638			P
7439-97-6	Mercury	0.026	B		CV
7440-02-0	Nickel	138		N	P
7440-09-7	Potassium	937			P
7782-49-2	Selenium	0.40	U	N	P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	265	B		P
7440-28-0	Thallium	0.68	U		P
7440-62-2	Vanadium	49.4		*	P
7440-66-6	Zinc	50.7			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS
-1-
INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPSD04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536022

Level (low/med): LOW Date Received: 07/26/03

% Solids: 74.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7930		*	P
7440-36-0	Antimony	0.75	B	N	P
7440-38-2	Arsenic	24.6		*	P
7440-39-3	Barium	112			P
7440-41-7	Beryllium	0.25	B		P
7440-43-9	Cadmium	0.39	B		P
7440-70-2	Calcium	2700		*	P
7440-47-3	Chromium	65.7		*	P
7440-48-4	Cobalt	20.8			P
7440-50-8	Copper	23.8			P
7439-89-6	Iron	18800			P
7439-92-1	Lead	3.2		*	P
7439-95-4	Magnesium	6510		*	P
7439-96-5	Manganese	1620			P
7439-97-6	Mercury	0.022	U		CV
7440-02-0	Nickel	99.8		N	P
7440-09-7	Potassium	710			P
7782-49-2	Selenium	0.88		N	P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	308	B		P
7440-28-0	Thallium	0.70	U		P
7440-62-2	Vanadium	28.8		*	P
7440-66-6	Zinc	37.7			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPSD42

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536017

Level (low/med): LOW Date Received: 07/26/03

% Solids: 19.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	42700		*	P
7440-36-0	Antimony	5.9	B	N	P
7440-38-2	Arsenic	55.7		*	P
7440-39-3	Barium	405			P
7440-41-7	Beryllium	1.2	B		P
7440-43-9	Cadmium	4.2			P
7440-70-2	Calcium	6750		*	P
7440-47-3	Chromium	191		*	P
7440-48-4	Cobalt	85.5			P
7440-50-8	Copper	323			P
7439-89-6	Iron	61100			P
7439-92-1	Lead	11.6		*	P
7439-95-4	Magnesium	18400		*	P
7439-96-5	Manganese	3090			P
7439-97-6	Mercury	0.35			CV
7440-02-0	Nickel	503		N	P
7440-09-7	Potassium	2650			P
7782-49-2	Selenium	2.9		N	P
7440-22-4	Silver	2.6	B		P
7440-23-5	Sodium	516	B		P
7440-28-0	Thallium	2.5	U		P
7440-62-2	Vanadium	106		*	P
7440-66-6	Zinc	556			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTRSD02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536018

Level (low/med): LOW Date Received: 07/26/03

% Solids: 77.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	16700		*	P
7440-36-0	Antimony	2.1	B	N	P
7440-38-2	Arsenic	54.4		*	P
7440-39-3	Barium	106			P
7440-41-7	Beryllium	0.38	B		P
7440-43-9	Cadmium	0.59	B		P
7440-70-2	Calcium	4280		*	P
7440-47-3	Chromium	145		*	P
7440-48-4	Cobalt	34.4			P
7440-50-8	Copper	49.8			P
7439-89-6	Iron	41700			P
7439-92-1	Lead	1.4		*	P
7439-95-4	Magnesium	15100		*	P
7439-96-5	Manganese	1010			P
7439-97-6	Mercury	0.019	U		CV
7440-02-0	Nickel	172		N	P
7440-09-7	Potassium	856			P
7782-49-2	Selenium	0.70		N	P
7440-22-4	Silver	0.26	U		P
7440-23-5	Sodium	152	B		P
7440-28-0	Thallium	0.86	B		P
7440-62-2	Vanadium	67.3		*	P
7440-66-6	Zinc	78.2			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTRSD04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536023

Level (low/med): LOW Date Received: 07/26/03

% Solids: 82.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10500		*	P
7440-36-0	Antimony	1.5	B	N	P
7440-38-2	Arsenic	24.2		*	P
7440-39-3	Barium	70.3			P
7440-41-7	Beryllium	0.26	B		P
7440-43-9	Cadmium	0.32	B		P
7440-70-2	Calcium	2940		*	P
7440-47-3	Chromium	87.0		*	P
7440-48-4	Cobalt	18.9			P
7440-50-8	Copper	27.9			P
7439-89-6	Iron	21700			P
7439-92-1	Lead	3.1		*	P
7439-95-4	Magnesium	10900		*	P
7439-96-5	Manganese	600			P
7439-97-6	Mercury	0.019	U		CV
7440-02-0	Nickel	124		N	P
7440-09-7	Potassium	833			P
7782-49-2	Selenium	0.80		N	P
7440-22-4	Silver	0.27	U		P
7440-23-5	Sodium	292	B		P
7440-28-0	Thallium	0.69	U		P
7440-62-2	Vanadium	36.7		*	P
7440-66-6	Zinc	50.0			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTRSD42

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536011

Level (low/med): LOW Date Received: 07/26/03

% Solids: 72.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14300		*	P
7440-36-0	Antimony	1.3	B	N	P
7440-38-2	Arsenic	30.9		*	P
7440-39-3	Barium	89.8			P
7440-41-7	Beryllium	0.32	B		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	4560		*	P
7440-47-3	Chromium	105		*	P
7440-48-4	Cobalt	27.2			P
7440-50-8	Copper	42.6			P
7439-89-6	Iron	33300			P
7439-92-1	Lead	3.1		*	P
7439-95-4	Magnesium	20200		*	P
7439-96-5	Manganese	1090			P
7439-97-6	Mercury	0.023	U		CV
7440-02-0	Nickel	215		N	P
7440-09-7	Potassium	888			P
7782-49-2	Selenium	0.45	U	N	P
7440-22-4	Silver	0.29	U		P
7440-23-5	Sodium	532	B		P
7440-28-0	Thallium	0.76	U		P
7440-62-2	Vanadium	58.5		*	P
7440-66-6	Zinc	85.2			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLUEPDSSD16

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Lab Sample ID: 536020

Level (low/med): LOW Date Received: 07/26/03

% Solids: 13.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10600		*	P
7440-36-0	Antimony	5.8	B	N	P
7440-38-2	Arsenic	279		*	P
7440-39-3	Barium	688			P
7440-41-7	Beryllium	1.6	B		P
7440-43-9	Cadmium	8.7			P
7440-70-2	Calcium	1680	B	*	P
7440-47-3	Chromium	24.8		*	P
7440-48-4	Cobalt	1480			P
7440-50-8	Copper	100			P
7439-89-6	Iron	459000			P
7439-92-1	Lead	22.1		*	P
7439-95-4	Magnesium	830	B	*	P
7439-96-5	Manganese	178000			P
7439-97-6	Mercury	0.11	U		CV
7440-02-0	Nickel	1300		N	P
7440-09-7	Potassium	886	B		P
7782-49-2	Selenium	50.3		N	P
7440-22-4	Silver	1.6	U		P
7440-23-5	Sodium	494	B		P
7440-28-0	Thallium	4.2	U		P
7440-62-2	Vanadium	10.4	B	*	P
7440-66-6	Zinc	1470			P

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Lead	1000.0	996.00	99.6	400.0	395.30	98.8	390.90	97.7	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Lead				400.0	397.40	99.4	392.10	98.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Lead				400.0	390.50	97.6			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Mercury	3.0	3.05	101.7	5.0	5.03	100.6	5.28	105.6	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Mercury				5.0	5.23	104.6			CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26160.00	100.6	30200.0	30610.00	101.4	30560.00	101.2	P
Antimony	250.0	251.10	100.4	300.0	307.80	102.6	308.30	102.8	P
Arsenic	250.0	250.40	100.2	100.0	105.00	105.0	104.30	104.3	P
Barium	500.0	497.30	99.5	200.0	204.20	102.1	202.70	101.4	P
Beryllium	500.0	502.60	100.5	100.0	101.60	101.6	101.40	101.4	P
Cadmium	500.0	493.10	98.6	100.0	101.20	101.2	99.97	100.0	P
Calcium	25000.0	25390.00	101.6	30200.0	30920.00	102.4	30580.00	101.3	P
Chromium	500.0	501.20	100.2	200.0	209.30	104.6	208.20	104.1	P
Cobalt	500.0	492.50	98.5	200.0	203.40	101.7	202.00	101.0	P
Copper	500.0	503.00	100.6	200.0	205.80	102.9	204.10	102.0	P
Iron	25500.0	26330.00	103.3	30200.0	30950.00	102.5	30850.00	102.2	P
Magnesium	25000.0	25410.00	101.6	30200.0	30800.00	102.0	30590.00	101.3	P
Manganese	500.0	495.40	99.1	200.0	204.20	102.1	202.50	101.2	P
Nickel	500.0	497.10	99.4	200.0	211.80	105.9	210.00	105.0	P
Potassium	25000.0	26340.00	105.4	30200.0	31480.00	104.2	31320.00	103.7	P
Selenium	250.0	246.50	98.6	100.0	100.90	100.9	100.10	100.1	P
Silver	500.0	499.70	99.9	100.0	102.20	102.2	101.80	101.8	P
Sodium	25000.0	25280.00	101.1	30200.0	30020.00	99.4	30070.00	99.6	P
Thallium	250.0	238.10	95.2	100.0	101.90	101.9	102.10	102.1	P
Vanadium	500.0	497.90	99.6	200.0	203.80	101.9	202.10	101.0	P
Zinc	500.0	498.80	99.8	200.0	204.00	102.0	203.00	101.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	30620.00	101.4	30540.00	101.1	P
Antimony				300.0	306.80	102.3	308.20	102.7	P
Arsenic				100.0	101.00	101.0	104.10	104.1	P
Barium				200.0	203.30	101.6	202.80	101.4	P
Beryllium				100.0	100.40	100.4	101.10	101.1	P
Cadmium				100.0	98.92	98.9	100.40	100.4	P
Calcium				30200.0	30250.00	100.2	30750.00	101.8	P
Chromium				200.0	207.70	103.8	208.70	104.4	P
Cobalt				200.0	200.40	100.2	202.50	101.2	P
Copper				200.0	204.20	102.1	203.00	101.5	P
Iron				30200.0	30700.00	101.7	30940.00	102.5	P
Magnesium				30200.0	30250.00	100.2	30610.00	101.4	P
Manganese				200.0	201.40	100.7	202.10	101.0	P
Nickel				200.0	208.20	104.1	211.90	106.0	P
Potassium				30200.0	31660.00	104.8	31500.00	104.3	P
Selenium				100.0	99.50	99.5	103.00	103.0	P
Silver				100.0	101.90	101.9	101.30	101.3	P
Sodium				30200.0	30090.00	99.6	29940.00	99.1	P
Thallium				100.0	102.10	102.1	101.20	101.2	P
Vanadium				200.0	201.20	100.6	202.10	101.0	P
Zinc				200.0	201.40	100.7	203.00	101.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Found	%R	Final Found	%R
Lead				6.0	4.18	69.7	5.93	98.8

Control Limits: no limits have been established by EPA at this time

USEPA - CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Mercury	0.2	0.19	95.0					

Control Limits: no limits have been established by EPA at this time

2B-IN
CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	499.30	124.8	497.00	124.2
Antimony				120.0	121.80	101.5	122.30	101.9
Arsenic				20.0	20.17	100.8	20.41	102.0
Barium				400.0	395.70	98.9	397.40	99.4
Beryllium				10.0	10.18	101.8	10.16	101.6
Cadmium				10.0	10.46	104.6	10.20	102.0
Calcium				10000.0	10420.00	104.2	10400.00	104.0
Chromium				20.0	17.09	85.4	18.13	90.6
Cobalt				100.0	98.29	98.3	98.55	98.6
Copper				50.0	54.57	109.1	54.73	109.5
Iron				200.0	234.60	117.3	253.00	126.5
Magnesium				10000.0	10180.00	101.8	10150.00	101.5
Manganese				30.0	28.80	96.0	28.88	96.3
Nickel				80.0	76.81	96.0	80.10	100.1
Potassium				10000.0	10720.00	107.2	10920.00	109.2
Selenium				10.0	9.02	90.2	11.13	111.3
Silver				20.0	20.27	101.4	19.58	97.9
Sodium				10000.0	9830.00	98.3	10030.00	100.3
Thallium				20.0	20.81	104.0	22.22	111.1
Vanadium				100.0	99.27	99.3	98.92	98.9
Zinc				40.0	42.82	107.0	42.95	107.4

Control Limits: no limits have been established by EPA at this time

USEPA - CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead	1.3	U	1.3	U	1.3	U	1.3	U	0.130	U	P

USEPA - CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead			1.3	U	1.3	U					P

USEPA - CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV

USEPA - CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	-39.7	B	-51.4	B	2.360	U	P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U	0.470	U	P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U	0.480	U	P
Barium	5.9	U	5.9	U	5.9	U	5.9	U	0.590	U	P
Beryllium	0.2	U	0.2	U	0.2	B	0.2	U	0.020	U	P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.060	U	P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U	18.210	U	P
Chromium	-4.3	B	-3.9	B	-4.0	B	-4.8	B	-0.343	B	P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U	0.200	U	P
Copper	2.4	U	2.4	U	2.4	U	-3.6	B	0.240	U	P
Iron	33.3	U	33.3	U	33.3	U	-47.2	B	3.330	U	P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U	17.830	U	P
Manganese	-1.4	B	-1.4	B	-1.4	B	-1.1	B	-0.104	B	P
Nickel	-8.4	B	-7.9	B	-8.6	B	-8.2	B	-1.129	B	P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U	39.300	U	P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U	0.340	U	P
Silver	2.2	U	2.2	U	2.2	U	2.2	U	0.220	U	P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U	79.380	B	P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U	0.570	U	P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	0.200	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	0.111	B	P

USEPA - CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			23.6	U							P
Antimony			4.7	U							P
Arsenic			4.8	U							P
Barium			5.9	U							P
Beryllium			0.2	U							P
Cadmium			0.6	U							P
Calcium			182.1	U							P
Chromium			-4.0	B							P
Cobalt			2.0	U							P
Copper			2.4	U							P
Iron			33.3	U							P
Magnesium			178.3	U							P
Manganese			-1.3	B							P
Nickel			-8.4	B							P
Potassium			393.0	U							P
Selenium			3.4	U							P
Silver			2.2	U							P
Sodium			472.7	U							P
Thallium			5.7	U							P
Vanadium			2.0	U							P
Zinc			1.0	U							P

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	41	1	48.1	117.3	3	48.0	117.1

USEPA - CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	504000	501800.0	103.9	506000	503700.0	104.3
Antimony	0	596	-5	623.9	104.7	-3	625.7	105.0
Arsenic	0	102	9	106.9	104.8	9	103.6	101.6
Barium	0	503	2	508.3	101.1	2	508.8	101.2
Beryllium	0	482	0	486.9	101.0	0	484.9	100.6
Cadmium	0	938	1	946.0	100.9	1	939.2	100.1
Calcium	500000	477840	496200	494000.0	103.4	497100	492000.0	103.0
Chromium	0	483	0	482.8	100.0	-1	481.3	99.6
Cobalt	0	457	-1	464.7	101.7	-1	462.7	101.2
Copper	0	526	3	520.9	99.0	3	519.5	98.8
Iron	200000	191980	203400	200100.0	104.2	204800	200200.0	104.3
Magnesium	500000	521880	545300	543600.0	104.2	546000	540400.0	103.5
Manganese	0	474	0	478.4	100.9	0	474.3	100.1
Nickel	0	952	-7	964.0	101.3	-6	959.8	100.8
Potassium	0	0	19	-29.1		61	-4.8	
Selenium	0	47	0	50.0	106.4	3	51.0	108.5
Silver	0	213	0	215.8	101.3	1	214.8	100.8
Sodium	0	0	18	-132.4		-94	-118.6	
Thallium	0	89	-2	90.4	101.6	-2	91.7	103.0
Vanadium	0	478	0	473.5	99.1	0	472.3	98.8
Zinc	0	998	5	1014.0	101.6	4	1006.0	100.8

USEPA - CLP FORMS

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

BLACSTPSD01S

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 77.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		15170.9600		12400.7598		233.40	1186.9		P
Antimony	75 - 125	40.0163		2.0776	B	58.35	65.0	N	P
Arsenic		24.3669		34.7097		4.67	-221.5		P
Barium	75 - 125	282.7635		67.4751		233.40	92.2		P
Beryllium	75 - 125	5.9587		0.3275	B	5.83	96.6		P
Cadmium	75 - 125	5.8093		0.3267	B	5.83	94.0		P
Chromium		164.0798		101.5118		23.34	268.1		P
Cobalt	75 - 125	77.5236		20.0157		58.35	98.6		P
Copper	75 - 125	57.5096		30.0360		29.17	94.2		P
Iron		33481.1484		29973.7109		116.70	3005.5		P
Lead	75 - 125	5.3868		3.2770		2.38	88.6		P
Manganese		671.7237		542.6425		58.35	221.2		P
Mercury	75 - 125	0.2344		0.0186	U	0.19	123.4		CV
Nickel	75 - 125	213.9106		130.8623		58.35	142.3	N	P
Selenium	75 - 125	1.1589		0.4965	B	1.17	56.6	N	P
Silver	75 - 125	5.3087		0.2742	U	5.83	91.1		P
Thallium	75 - 125	5.7965		0.7104	U	5.83	99.4		P
Vanadium	75 - 125	124.4019		58.5266		58.35	112.9		P
Zinc	75 - 125	117.0498		55.3610		58.35	105.7		P

Comments:

USEPA - CLP FORMS

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

BLACSTPSD01A

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS SDG No.: GCD003

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		101200.00		99500.00		2000.0	85.0		P
Antimony		541.30		16.67	B	500.0	104.9		P
Arsenic		311.50		278.50		40.0	82.5		P
Barium		2619.00		541.40		2000.0	103.9		P
Beryllium		54.46		2.63	B	50.0	103.7		P
Cadmium		53.21		2.62	B	50.0	101.2		P
Chromium		1015.00		814.50		200.0	100.2		P
Cobalt		666.40		160.60		500.0	101.2		P
Copper		511.40		241.00		250.0	108.2		P
Iron		238000.00		240500.00		1000.0	-250.0		P
Lead		44.34		27.57		20.0	83.8		P
Manganese		4802.00		4354.00		500.0	89.6		P
Nickel		1547.00		1050.00		500.0	99.4		P
Selenium		13.10		3.98	B	10.0	91.2		P
Silver		52.32		2.20	U	50.0	104.6		P
Thallium		53.18		5.70	U	50.0	106.4		P
Vanadium		991.10		469.60		500.0	104.3		P
Zinc		947.00		444.20		500.0	100.6		P

Comments:

6

DUPLICATES

SAMPLE NO.

BLACSTPSD01D

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 77.9 % Solids for Duplicate: 76.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		12400.7598		17632.6699		34.8	*	P
Antimony		2.0776	B	1.7899	B	14.9		P
Arsenic		34.7097		19.1949		57.6	*	P
Barium	24.9	67.4751		73.7762		8.9		P
Beryllium		0.3275	B	0.2586	B	23.5		P
Cadmium		0.3267	B	0.2567	B	24.0		P
Calcium		3117.0161		4049.7009		26.0	*	P
Chromium		101.5118		172.0881		51.6	*	P
Cobalt	6.2	20.0157		23.8090		17.3		P
Copper		30.0360		25.1532		17.7		P
Iron		29973.7109		32516.2891		8.1		P
Lead		3.2770		2.6268		22.0	*	P
Magnesium		10387.9805		23615.1797		77.8	*	P
Manganese		542.6425		590.6218		8.5		P
Mercury		0.0186	U	0.0189	U			CV
Nickel		130.8623		152.8326		15.5		P
Potassium	623.2	808.9785		755.9280		6.8		P
Selenium		0.4965	B	0.4495	B	9.9		P
Silver		0.2742	U	0.2664	U			P
Sodium		276.6804	B	245.1135	B	12.1		P
Thallium		0.7104	U	0.8815	B	200.0		P
Vanadium		58.5266		75.5444		25.4	*	P
Zinc		55.3610		50.0642		10.0		P

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Solid LCS Source: ERA lot249/USEPA 0996/ERA lot0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Lead				22.0	22.1		17.6 | 26.4	100.5

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Solid LCS Source: ERA lot249/USEPA 0996/ERA lot0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Mercury				0.1	0.1		0.1 0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Solid LCS Source: ERA lot249/USEPA 0996/ERA lot0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	218.6		160.0	240.0	109.3
Antimony				50.0	54.4		40.0	60.0	108.8
Arsenic				24.0	25.0		19.2	28.8	104.2
Barium				200.0	213.6		160.0	240.0	106.8
Beryllium				5.0	5.4		4.0	6.0	108.0
Cadmium				25.0	26.6		20.0	30.0	106.4
Calcium				2000.0	2174.0		1600.0	2400.0	108.7
Chromium				20.0	21.7		16.0	24.0	108.5
Cobalt				50.0	53.0		40.0	60.0	106.0
Copper				25.0	28.1		20.0	30.0	112.4
Iron				100.0	109.3		80.0	120.0	109.3
Magnesium				2000.0	2127.0		1600.0	2400.0	106.4
Manganese				50.0	54.1		40.0	60.0	108.2
Nickel				50.0	52.6		40.0	60.0	105.2
Potassium				2000.0	2083.0		1600.0	2400.0	104.2
Selenium				21.0	20.5		16.8	25.2	97.6
Silver				25.0	26.7		20.0	30.0	106.8
Sodium				2000.0	2179.0		1600.0	2400.0	109.0
Thallium				25.0	25.8		20.0	30.0	103.2
Vanadium				50.0	54.4		40.0	60.0	108.8
Zinc				50.0	53.3		40.0	60.0	106.6

9
ICP SERIAL DILUTIONS

SAMPLE NO.

BLACSTPSD01L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	99500.00		104400.00		4.9		P
Antimony	16.67	B	23.50	U	100.0		P
Arsenic	278.50		300.60		7.9		P
Barium	541.40		552.90	B	2.1		P
Beryllium	2.63	B	3.56	B	35.4		P
Cadmium	2.62	B	3.37	B	28.6		P
Calcium	25010.00		26560.00		6.2		P
Chromium	814.50		826.80		1.5		P
Cobalt	160.60		166.60	B	3.7		P
Copper	241.00		235.50		2.3		P
Iron	240500.00		250200.00		4.0		P
Lead	27.57		24.28		11.9		P
Magnesium	83350.00		85790.00		2.9		P
Manganese	4354.00		4519.00		3.8		P
Nickel	1050.00		1059.00		0.9		P
Potassium	6491.00		6961.00	B	7.2		P
Selenium	3.98	B	17.00	U	100.0		P
Silver	2.20	U	11.00	U			P
Sodium	2220.00	B	3054.00	B	37.6		P
Thallium	5.70	U	28.50	U			P
Vanadium	469.60		482.50		2.7		P
Zinc	444.20		467.30		5.2		P

USEPA - CLP FORMS

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

ICP ID Number: Date: 08/20/03

Flame AA ID Number: LEEMAN PS200

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Iron	271.441		100	33.3	P
Lead	220.353		3	1.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Selenium	196.026		5	3.4	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Thallium	190.864		10	5.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

USEPA - CLP FORMS

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ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Iron	10.00	1000000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments:

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Method: CV

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLACADSSD11	09/16/03	0.65	100.0
BLACPDSSD10	09/16/03	0.67	100.0
BLACPDSSD41	09/16/03	0.63	100.0
BLACPDSSD43	09/16/03	0.68	100.0
BLACSTPSD01	09/16/03	0.69	100.0
BLACSTPSD01D	09/16/03	0.68	100.0
BLACSTPSD01S	09/16/03	0.69	100.0
BLACSTPSD02	09/16/03	0.61	100.0
BLACSTPSD03	09/16/03	0.68	100.0
BLACSTPSD04	09/16/03	0.60	100.0
BLACSTPSD42	09/16/03	0.70	100.0
BLACSTRSD02	09/16/03	0.67	100.0
BLACSTRSD04	09/16/03	0.63	100.0
BLACSTRSD42	09/16/03	0.60	100.0
BLUEPDSSD16	09/16/03	0.70	100.0
LCSS0916A	09/16/03	1.00	100.0
PBS0916A	09/16/03	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLACADSSD11	08/22/03	1.05	100.0
BLACPDSSD10	08/22/03	1.00	100.0
BLACPDSSD41	08/22/03	1.00	100.0
BLACPDSSD43	08/22/03	1.02	100.0
BLACSTPSD01	08/22/03	1.03	100.0
BLACSTPSD01D	08/22/03	1.06	100.0
BLACSTPSD01S	08/22/03	1.10	100.0
BLACSTPSD02	08/22/03	1.05	100.0
BLACSTPSD03	08/22/03	1.06	100.0
BLACSTPSD04	08/22/03	1.09	100.0
BLACSTPSD42	08/22/03	1.20	100.0
BLACSTRSD02	08/22/03	1.08	100.0
BLACSTRSD04	08/22/03	1.00	100.0
BLACSTRSD42	08/22/03	1.04	100.0
BLUEPDSSD16	08/22/03	1.00	100.0
LCSS0822D	08/22/03	1.00	100.0
PBS0822D	08/22/03	1.00	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLACADSSD11	09/11/03	1.07	100.0
BLACPDSSD10	09/11/03	1.04	100.0
BLACPDSSD41	09/11/03	1.10	100.0
BLACPDSSD43	09/11/03	1.02	100.0
BLACSTPSD01	09/11/03	1.08	100.0
BLACSTPSD01D	09/11/03	1.08	100.0
BLACSTPSD01S	09/11/03	1.08	100.0
BLACSTPSD02	09/11/03	1.10	100.0
BLACSTPSD03	09/11/03	1.08	100.0
BLACSTPSD04	09/11/03	1.06	100.0
BLACSTPSD42	09/11/03	1.00	100.0
BLACSTRSD02	09/11/03	1.13	100.0
BLACSTRSD04	09/11/03	1.01	100.0
BLACSTRSD42	09/11/03	1.12	100.0
BLUEPDSSD16	09/11/03	1.04	100.0
LCSS0911I	09/11/03	1.00	100.0
PBS0911I	09/11/03	1.00	100.0

USEPA - CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/13/03 End Date: 09/13/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1033													X												
S	1.00	1038																									
S	1.00	1042													X												
S	1.00	1045																									
LRS	1.00	1050													X												
LRS	1.00	1055													X												
LRS	1.00	1100													X												
ICV	1.00	1105													X												
ICB	1.00	1109													X												
ICSA	1.00	1114													X												
ICSAB	1.00	1119													X												
CRI	1.00	1124													X												
CRILOW	1.00	1128													X												
CCV	1.00	1133													X												
CCB	1.00	1138													X												
ZZZZZZ	1.00	1143																									
ZZZZZZ	1.00	1147																									
ZZZZZZ	1.00	1152																									
ZZZZZZ	5.00	1157																									
ZZZZZZ	1.00	1201																									
ZZZZZZ	1.00	1206																									
ZZZZZZ	1.00	1211																									
ZZZZZZ	1.00	1215																									
ZZZZZZ	1.00	1220																									
ZZZZZZ	1.00	1225																									
CCV	1.00	1229													X												
CCB	1.00	1234													X												
PBS0911I	1.00	1239													X												
LCSS0911I	1.00	1244													X												
BLACSTRSD42	1.00	1248													X												
BLACPDSSD41	1.00	1253													X												
BLACSTPSD01	1.00	1258													X												
BLACSTPSD01L	5.00	1302													X												
BLACSTPSD01A	1.00	1307													X												
BLACSTPSD01D	1.00	1312													X												
BLACSTPSD01S	1.00	1316													X												
BLACADSSD11	1.00	1321													X												
CCV	1.00	1326													X												

USEPA - CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/13/03 End Date: 09/13/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CCB	1.00	1331													X												
BLACPDSSD43	1.00	1335													X												
BLACSTPSD02	1.00	1340													X												
BLACSTPSD42	1.00	1345													X												
BLACSTRSD02	1.00	1349													X												
BLACSTPSD03	1.00	1354													X												
BLUEPDSSD16	1.00	1359													X												
BLACPDSSD10	1.00	1403													X												
BLACSTPSD04	1.00	1408													X												
BLACSTRSD04	1.00	1413													X												
CCV	1.00	1417													X												
CCB	1.00	1422													X												
ICSA	1.00	1427													X												
ICSAB	1.00	1432													X												
CRI	1.00	1437													X												
CRILOW	1.00	1441													X												
CCV	1.00	1446													X												
CCB	1.00	1451													X												

USEPA - CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCD003

Instrument ID Number: LEEMAN PS200 Method: CV

Start Date: 09/16/03 End Date: 09/16/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2029																X									
S0.2	1.00	2032																X									
S0.5	1.00	2036																X									
S1	1.00	2039																X									
S5	1.00	2042																X									
S10	1.00	2046																X									
ICV	1.00	2050																X									
ICB	1.00	2053																X									
cra	1.00	2056																X									
CCV	1.00	2059																X									
CCB	1.00	2103																X									
PBS0916A	1.00	2106																X									
LCSS0916A	1.00	2109																X									
BLACSTRSD42	1.00	2112																X									
BLACPDSSD41	1.00	2115																X									
BLACSTPSD01	1.00	2119																X									
BLACSTPSD01D	1.00	2122																X									
BLACSTPSD01S	1.00	2125																X									
BLACADSSD11	1.00	2128																X									
BLACPDSSD43	1.00	2131																X									
CCV	1.00	2134																X									
CCB	1.00	2138																X									
BLACSTPSD02	1.00	2141																X									
BLACSTPSD42	1.00	2144																X									
BLACSTRSD02	1.00	2147																X									
BLACSTPSD03	1.00	2150																X									
BLUEPDSSD16	1.00	2153																X									
BLACPDSSD10	1.00	2156																X									
BLACSTPSD04	1.00	2159																X									
BLACSTRSD04	1.00	2203																X									
CCV	1.00	2206																X									
CCB	1.00	2209																X									

USEPA - CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/09/03 End Date: 09/09/03

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN					
S0	1.00	0222		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
S	1.00	0227		X						X				X		X				X			X									
S	1.00	0231			X	X															X			X								
S	1.00	0235					X	X	X		X	X	X				X		X			X			X	X						
LRS	1.00	0240		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
LRS	1.00	0246		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
LRS	1.00	0251		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
ICV	1.00	0256		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
ICB	1.00	0301		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
ICSA	1.00	0306		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
ICSAB	1.00	0311		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CRI	1.00	0316		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CCV	1.00	0321		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CCB	1.00	0327		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
PBS0822D	1.00	0332		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
LCSS0822D	1.00	0337		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTRSD42	1.00	0342		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACPDSSD41	1.00	0347		X	X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X						
BLACSTPSD01	1.00	0352		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD01L	5.00	0357		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD01A	1.00	0402		X	X	X	X	X	X		X	X	X	X			X		X		X	X		X	X	X						
BLACSTPSD01D	1.00	0407		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD01S	1.00	0412		X	X	X	X	X	X		X	X	X	X			X		X		X	X		X	X	X						
BLACADSSD11	1.00	0417		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CCV	1.00	0422		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CCB	1.00	0427		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACPDSSD43	1.00	0432		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD02	1.00	0437		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD42	1.00	0443		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTRSD02	1.00	0448		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD03	1.00	0453		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLUEPDSSD16	1.00	0458		X	X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X						
BLACPDSSD10	1.00	0503		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACSTPSD04	1.00	0508		X	X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X						
BLACSTRSD04	1.00	0513		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
BLACPDSSD41	10.00	0518															X															
CCV	1.00	0523		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						
CCB	1.00	0528		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X						

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCD003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/09/03 End Date: 09/09/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	10.00	0533																										
BLUEPDSSD16	100.00	0538															X											
BLACSTPSD04	10.00	0543															X											
ICSA	1.00	0548		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
ICSAB	1.00	0553		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CRI	1.00	0559		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCV	1.00	0604		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCB	1.00	0609		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		

SEVERN TRENT STL

Geotechnical Analysis
Sample Data Summary Package

EASEAT SDG # GCD003

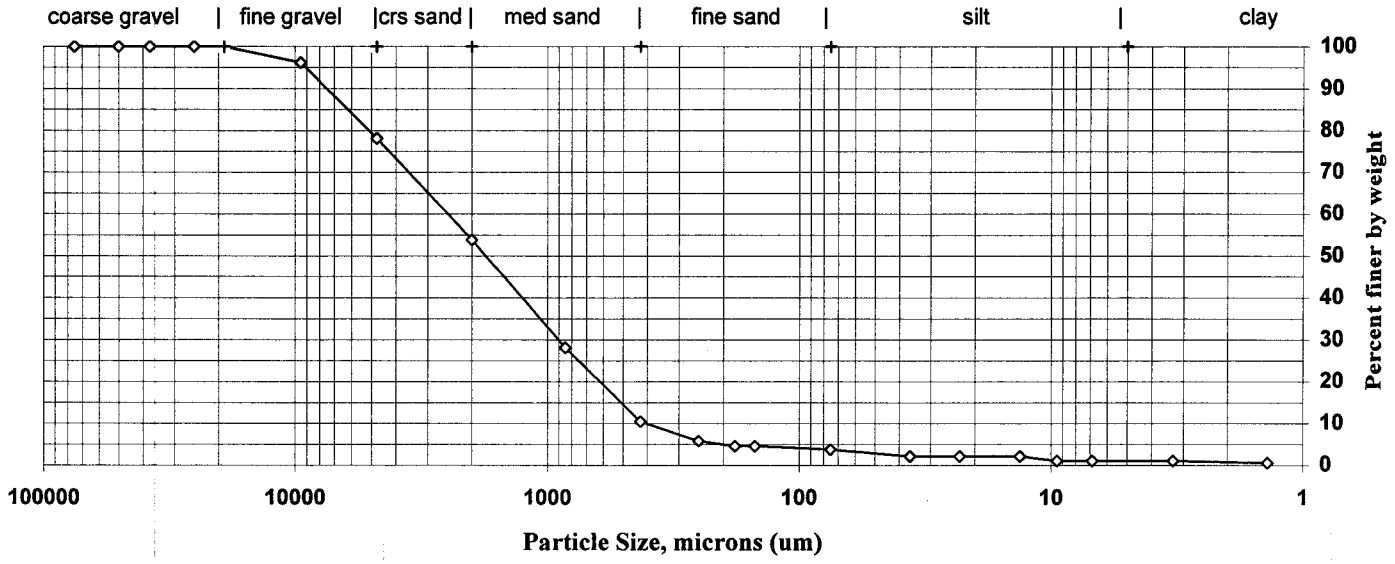
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536011 **Sample ID:** RSD-42

Percent Solids:	78.1%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.2	3.8
#4	4750	78.2	18.0
#10	2000	53.8	24.4
#20	850	28.1	25.7
#40	425	10.5	17.6
#60	250	5.8	4.7
#80	180	4.6	1.2
#100	150	4.6	0.0
#200	75	3.7	0.8
Hydrometer	36.3	2.1	1.6
|	22.9	2.1	0.0
|	13.2	2.1	0.0
|	9.4	1.1	1.1
|	6.9	1.1	0.0
|	3.3	1.1	0.0
V	1.4	0.6	0.4

Soil Classification	Percent of Total Sample
Gravel	21.8
Sand	74.4
Coarse Sand	24.4
Medium Sand	43.3
Fine Sand	6.8
Silt	2.7
Clay	1.1

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

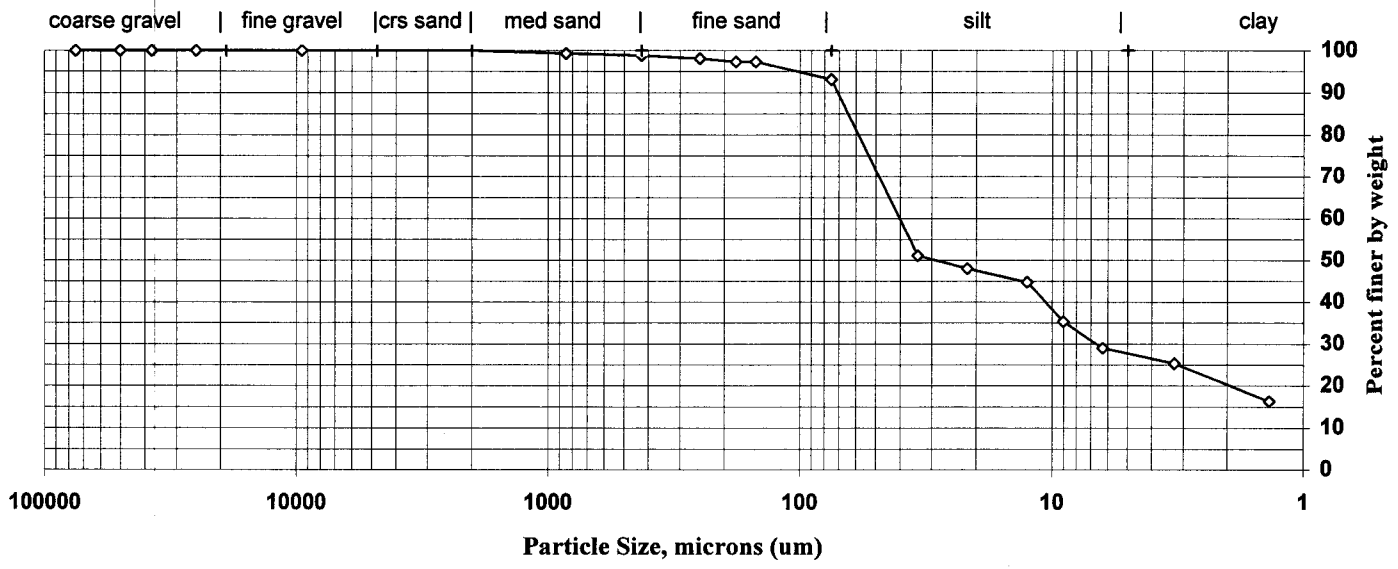
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536012 **Sample ID:** SSD-41

Percent Solids:	24.2%		**Maximum Particle Size:**	Med sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	N/A	
Non-soil mass:	0.3%		**Hardness (> #10):**	N/A	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.3	0.7
#40	425	98.9	0.5
#60	250	98.1	0.7
#80	180	97.3	0.8
#100	150	97.3	0.0
#200	75	93.1	4.2
Hydrometer	34.1	51.2	41.9
|	21.7	48.0	3.2
|	12.6	44.8	3.2
|	9.0	35.3	9.5
|	6.3	29.0	6.3
|	3.2	25.3	3.7
V	1.4	16.3	9.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	6.9
Coarse Sand	0.0
Medium Sand	1.1
Fine Sand	5.8
Silt	64.1
Clay	29.0

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

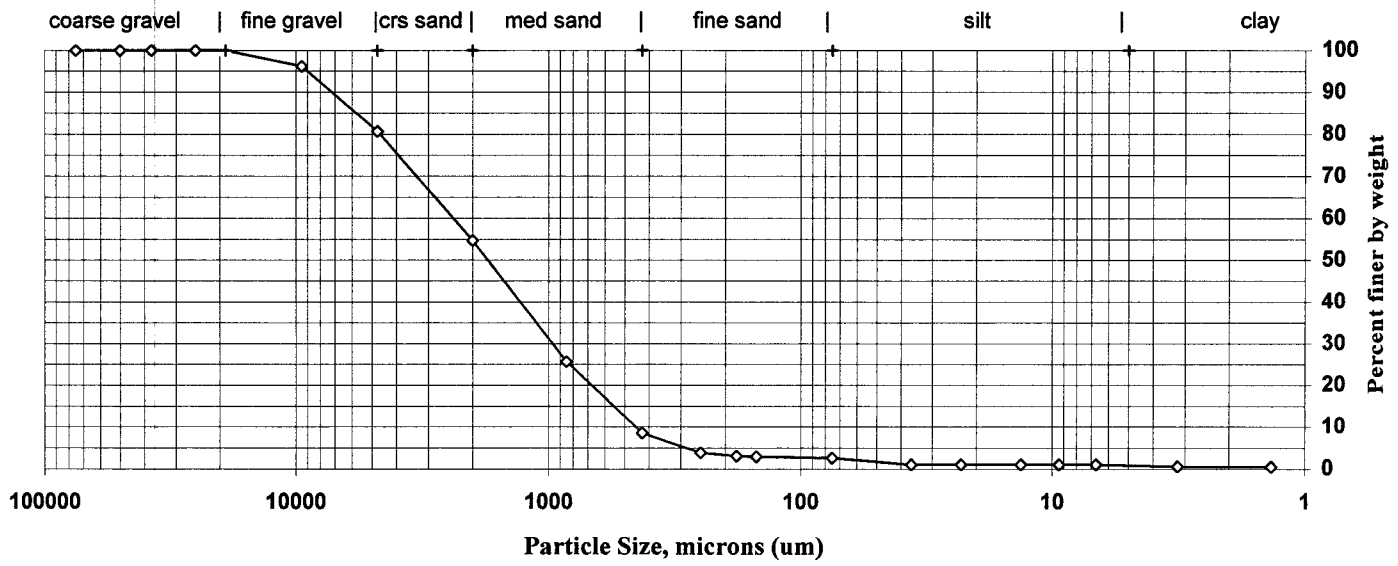
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536013 **Sample ID:** PSD-01

Percent Solids:	83.1%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	96.2	3.8
#4	4750	80.6	15.6
#10	2000	54.8	25.9
#20	850	25.7	29.1
#40	425	8.6	17.1
#60	250	3.9	4.7
#80	180	3.1	0.8
#100	150	2.9	0.1
#200	75	2.6	0.4
Hydrometer	36.3	1.0	1.5
|	23.0	1.0	0.0
|	13.3	1.0	0.0
|	9.4	1.0	0.0
|	6.7	1.0	0.0
|	3.2	0.6	0.4
V	1.4	0.6	0.1

Soil Classification	Percent of Total Sample
Gravel	19.4
Sand	78.1
Coarse Sand	25.9
Medium Sand	46.2
Fine Sand	6.0
Silt	1.5
Clay	1.0

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

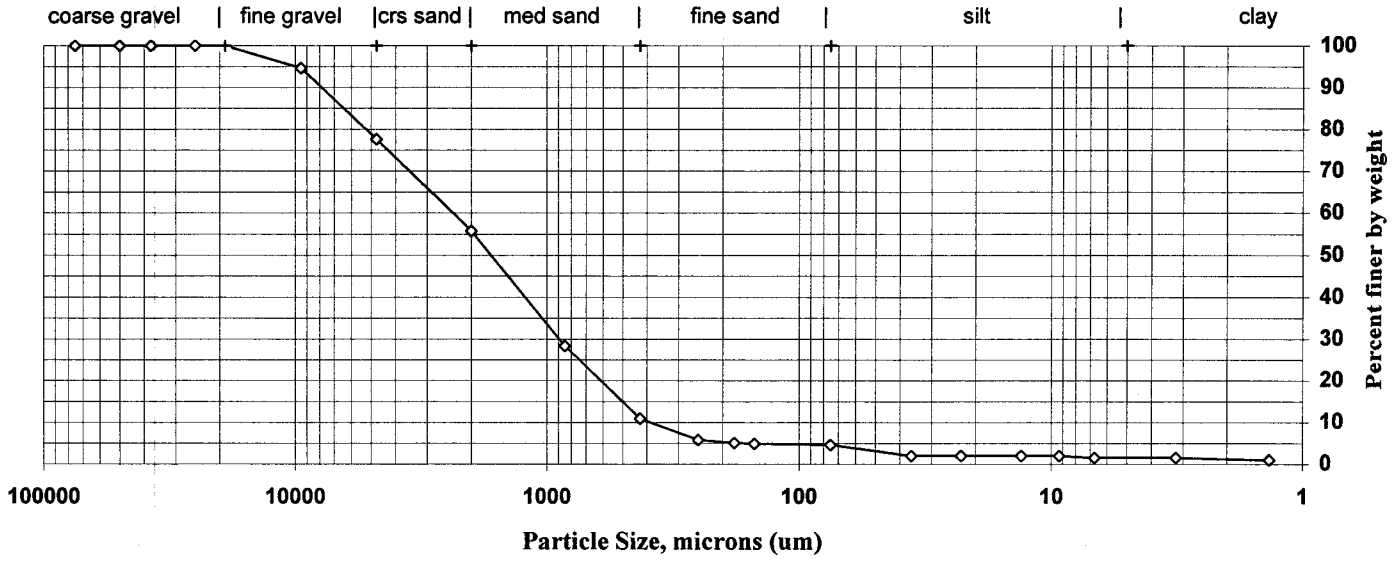
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536013DP **Sample ID:** PSD-01REP

Percent Solids:	84.7%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	94.6	5.4
#4	4750	77.6	17.0
#10	2000	55.7	21.9
#20	850	28.4	27.3
#40	425	11.0	17.4
#60	250	5.8	5.1
#80	180	5.0	0.8
#100	150	4.9	0.1
#200	75	4.6	0.3
Hydrometer	36.0	2.0	2.6
|	22.8	2.0	0.0
|	13.2	2.0	0.0
|	9.3	2.0	0.0
|	6.7	1.5	0.5
|	3.2	1.5	0.0
V	1.4	1.0	0.5

Soil Classification	Percent of Total Sample
Gravel	22.4
Sand	73.0
Coarse Sand	21.9
Medium Sand	44.7
Fine Sand	6.4
Silt	3.1
Clay	1.5

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

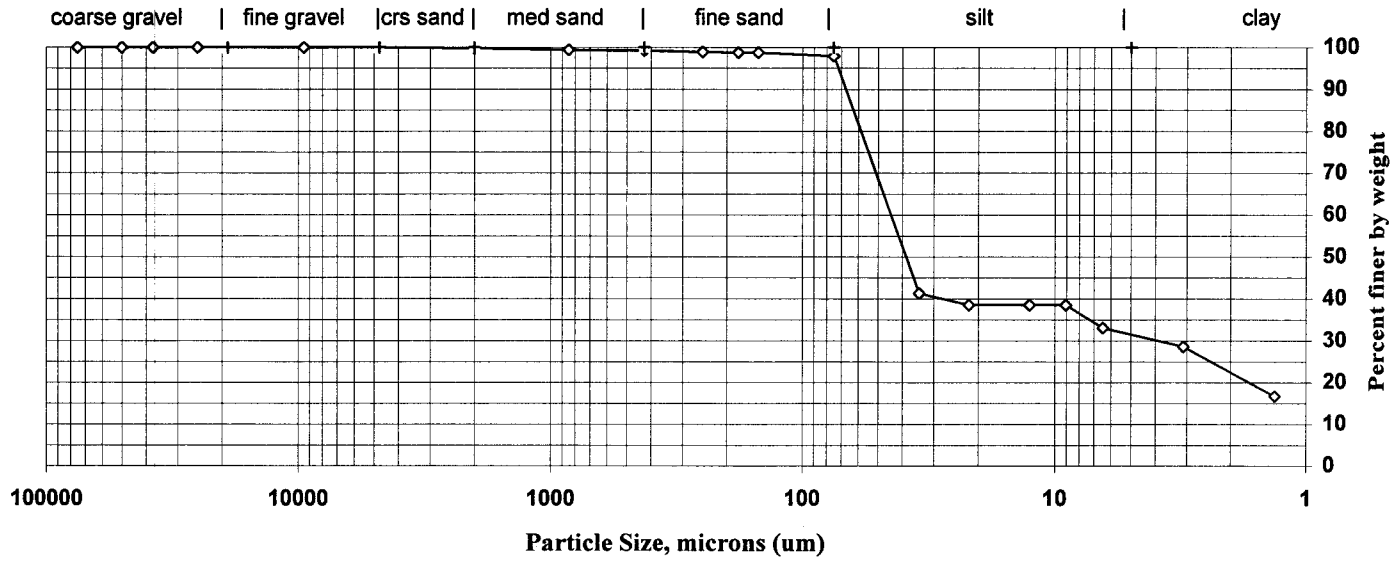
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536014 **Sample ID:** SSD-11

Percent Solids:	26.6%		**Maximum Particle Size:**	Crs sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	1.1%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	99.4	0.3
#40	425	99.3	0.2
#60	250	98.9	0.3
#80	180	98.8	0.1
#100	150	98.7	0.0
#200	75	97.9	0.8
Hydrometer	34.3	41.3	56.7
|	21.8	38.5	2.7
|	12.6	38.5	0.0
|	9.0	38.5	0.0
|	6.5	33.1	5.4
|	3.1	28.6	4.5
V	1.3	16.8	11.8

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	2.1
Coarse Sand	0.2
Medium Sand	0.5
Fine Sand	1.3
Silt	64.8
Clay	33.1

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

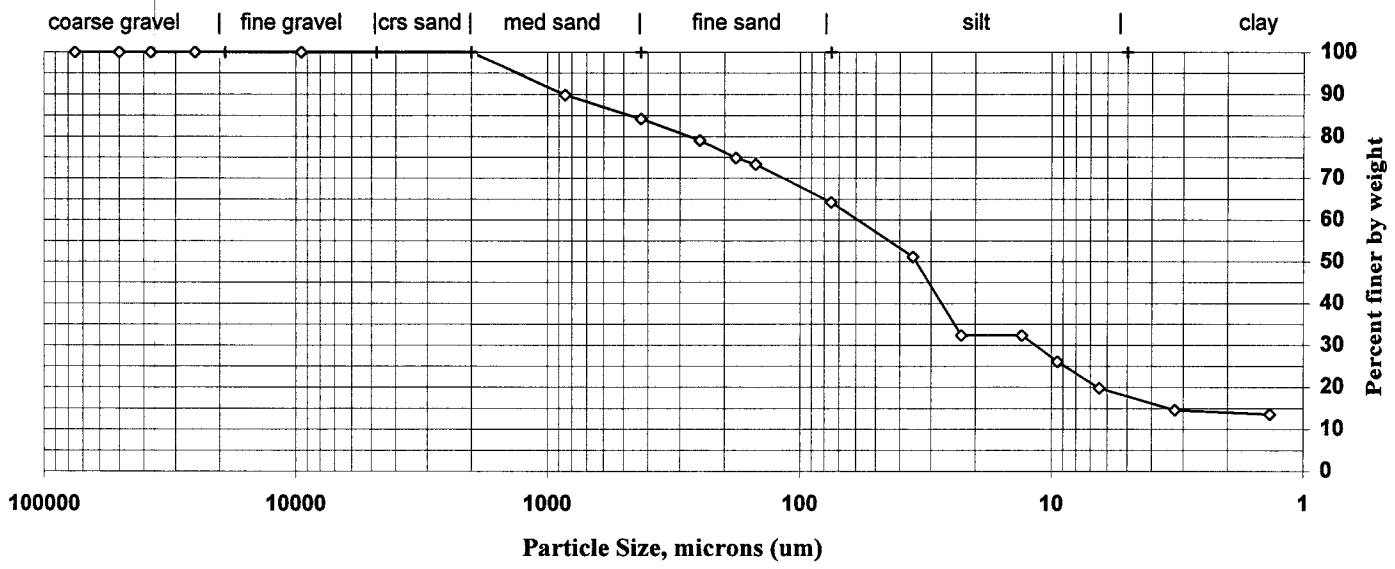
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536015 **Sample ID:** SSD-43

Percent Solids:	12.7%		**Maximum Particle Size:**	Med sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	N/A	
Non-soil mass:	16.8%		**Hardness (> #10):**	N/A	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	89.9	10.1
#40	425	84.2	5.7
#60	250	79.0	5.1
#80	180	74.9	4.1
#100	150	73.3	1.6
#200	75	64.2	9.1
Hydrometer	35.4	51.2	13.0
|	22.7	32.4	18.8
|	13.1	32.4	0.0
|	9.5	26.1	6.3
|	6.4	19.8	6.3
|	3.2	14.6	5.2
V	1.4	13.6	1.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	35.8
Coarse Sand	0.0
Medium Sand	15.8
Fine Sand	20.0
Silt	44.4
Clay	19.8

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

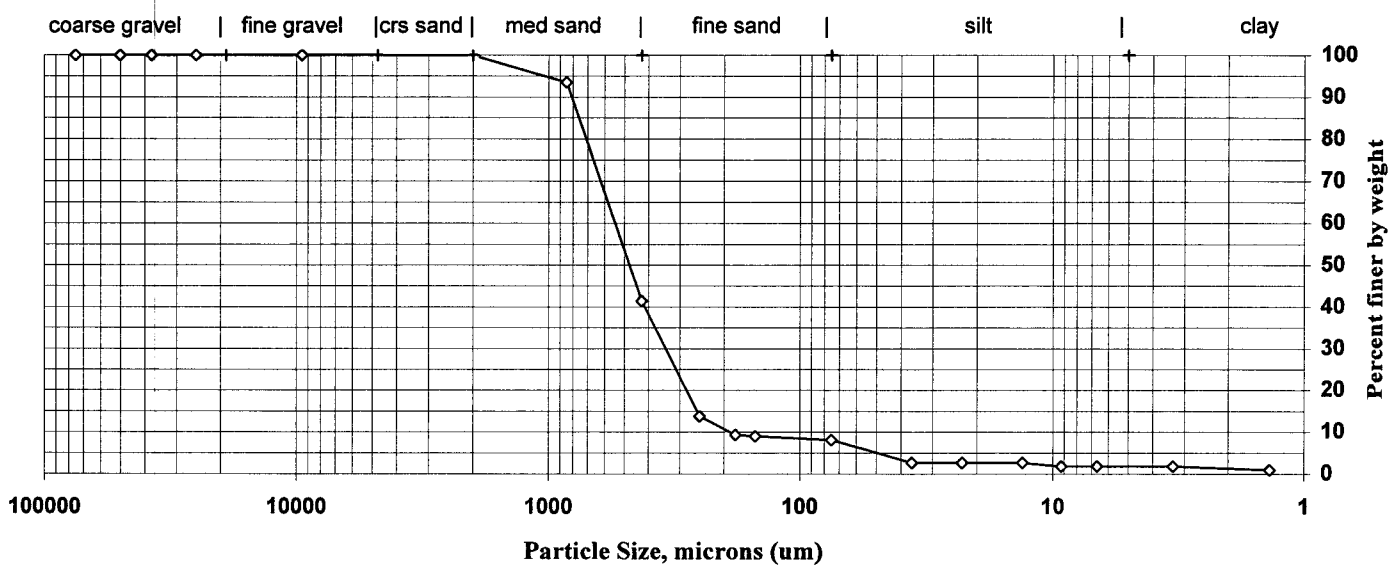
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536016 **Sample ID:** PSD-02

Percent Solids:	79.0%		**Maximum Particle Size:**	Crs sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	0.0%		**Hardness (> #10):**	brittle	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	93.5	6.5
#40	425	41.5	52.0
#60	250	13.7	27.7
#80	180	9.3	4.5
#100	150	9.0	0.3
#200	75	8.1	0.9
Hydrometer	36.2	2.7	5.4
|	22.9	2.7	0.0
|	13.2	2.7	0.0
|	9.2	1.8	0.8
|	6.6	1.8	0.0
|	3.3	1.8	0.0
V	1.4	1.0	0.8

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	91.9
Coarse Sand	0.0
Medium Sand	58.5
Fine Sand	33.4
Silt	6.3
Clay	1.8

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

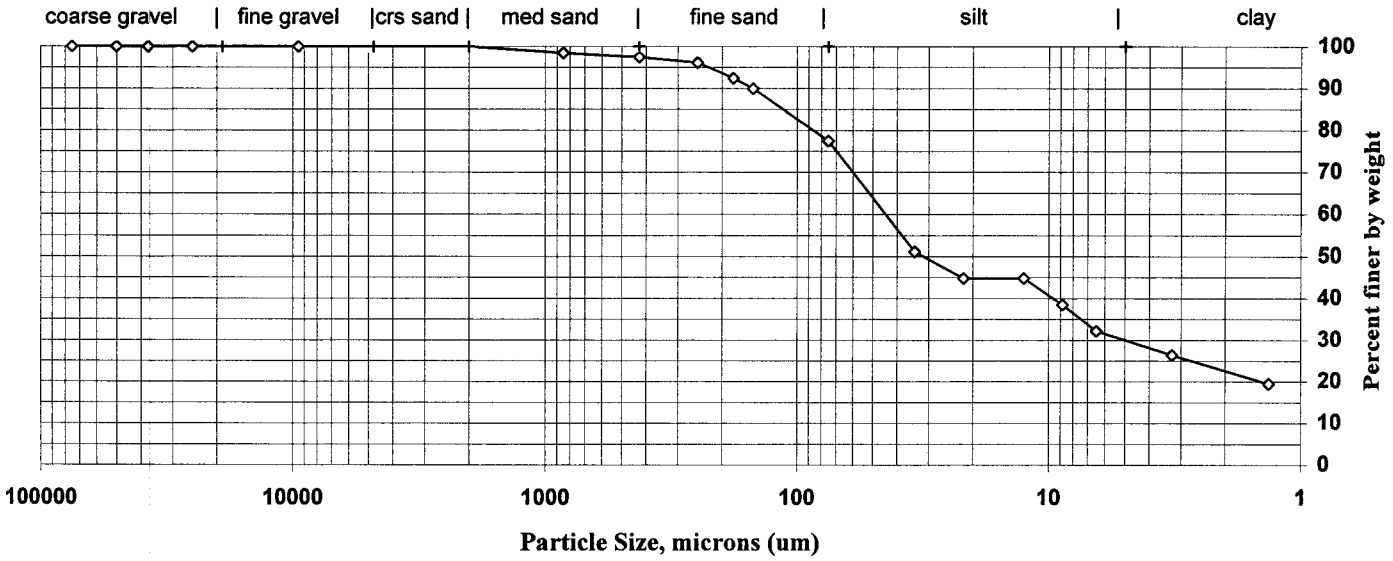
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536017 **Sample ID:** PSD-42

Percent Solids:	22.9%		**Maximum Particle Size:**	Med sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	N/A	
Non-soil mass:	0.9%		**Hardness (> #10):**	N/A	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	98.5	1.5
#40	425	97.5	1.0
#60	250	96.2	1.3
#80	180	92.4	3.7
#100	150	90.0	2.5
#200	75	77.4	12.5
Hydrometer	34.1	51.1	26.3
|	21.8	44.8	6.3
|	12.6	44.8	0.0
|	8.8	38.5	6.3
|	6.5	32.2	6.3
|	3.3	26.4	5.8
V	1.3	19.5	6.9

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	22.6
Coarse Sand	0.0
Medium Sand	2.5
Fine Sand	20.0
Silt	45.3
Clay	32.2

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

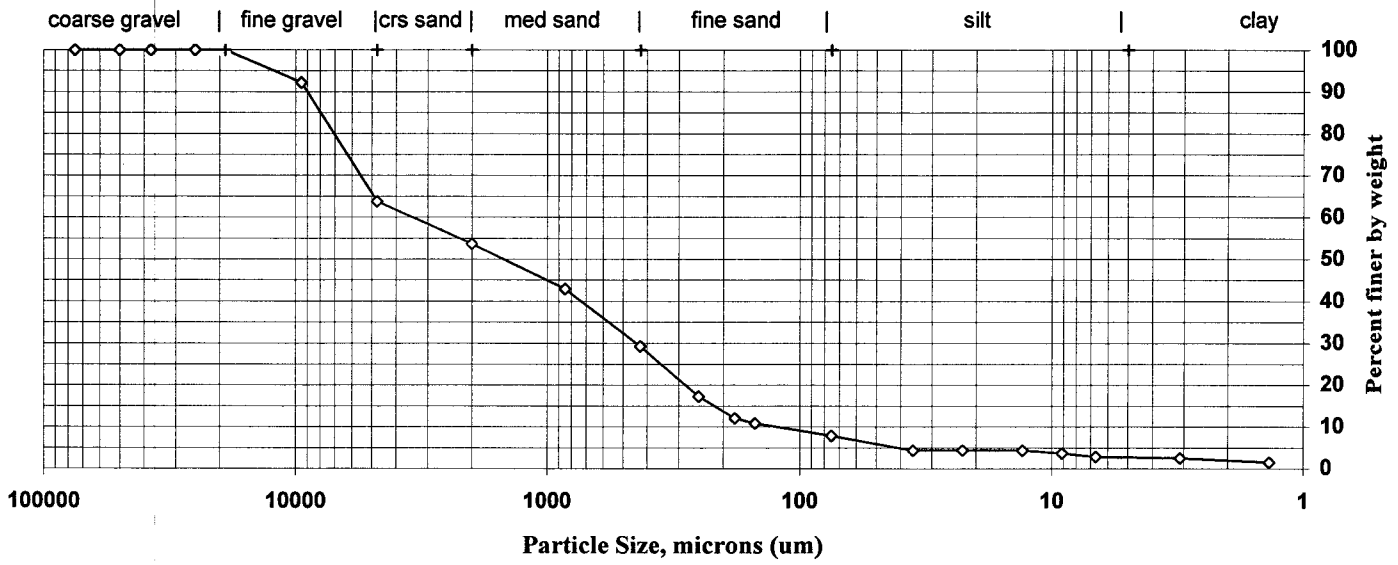
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536018 **Sample ID:** RSD-02

Percent Solids:	87.3%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subangular	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	92.2	7.8
#4	4750	63.7	28.5
#10	2000	53.7	10.1
#20	850	42.9	10.8
#40	425	29.3	13.6
#60	250	17.3	12.0
#80	180	12.0	5.2
#100	150	10.9	1.2
#200	75	7.9	3.0
Hydrometer	35.7	4.4	3.5
|	22.6	4.4	0.0
|	13.0	4.4	0.0
|	9.1	3.7	0.7
|	6.7	2.8	0.8
|	3.1	2.5	0.4
V	1.4	1.5	0.9

Soil Classification	Percent of Total Sample
Gravel	36.3
Sand	55.8
Coarse Sand	10.1
Medium Sand	24.4
Fine Sand	21.4
Silt	5.0
Clay	2.8

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

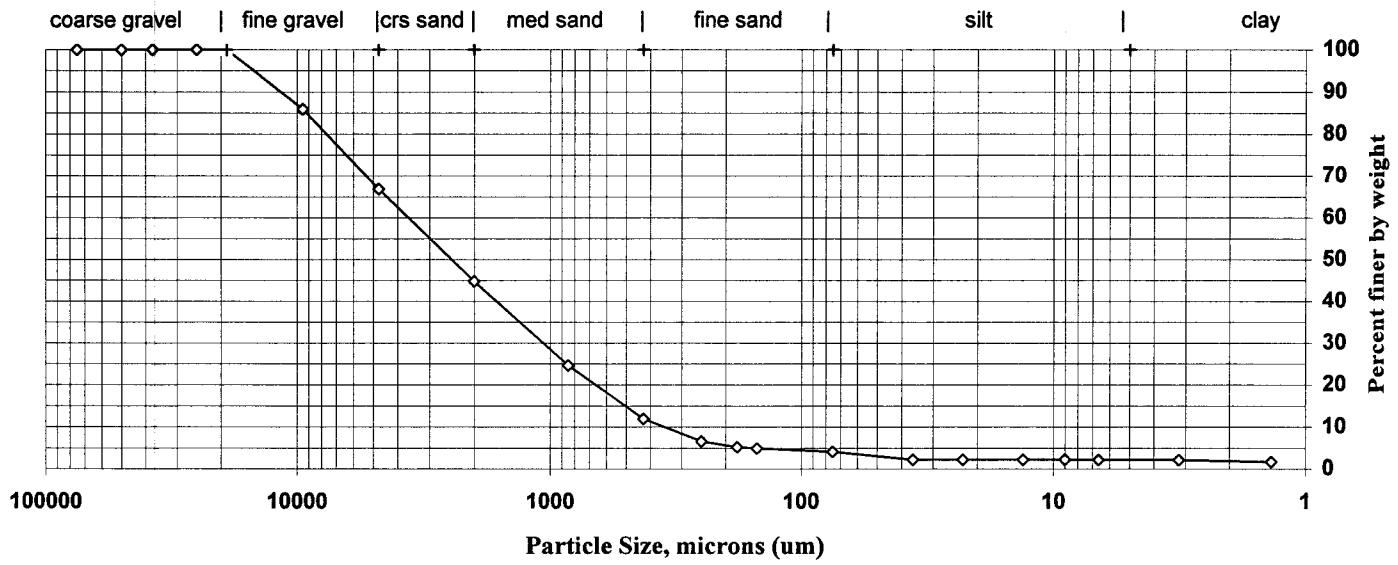
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536019 **Sample ID:** PSD-03

Percent Solids:	86.7%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	85.9	14.1
#4	4750	66.9	19.1
#10	2000	44.8	22.0
#20	850	24.6	20.2
#40	425	12.0	12.7
#60	250	6.6	5.3
#80	180	5.2	1.4
#100	150	5.0	0.2
#200	75	4.2	0.8
Hydrometer	36.0	2.2	1.9
|	22.8	2.2	0.0
|	13.2	2.2	0.0
|	9.0	2.2	0.0
|	6.6	2.1	0.1
|	3.2	2.1	0.0
V	1.4	1.7	0.4

Soil Classification	Percent of Total Sample
Gravel	33.1
Sand	62.7
Coarse Sand	22.0
Medium Sand	32.9
Fine Sand	7.8
Silt	2.0
Clay	2.1

Dispersion Device: Mechanical mixer with a metal paddle.

Dispersion Period: 1 minute

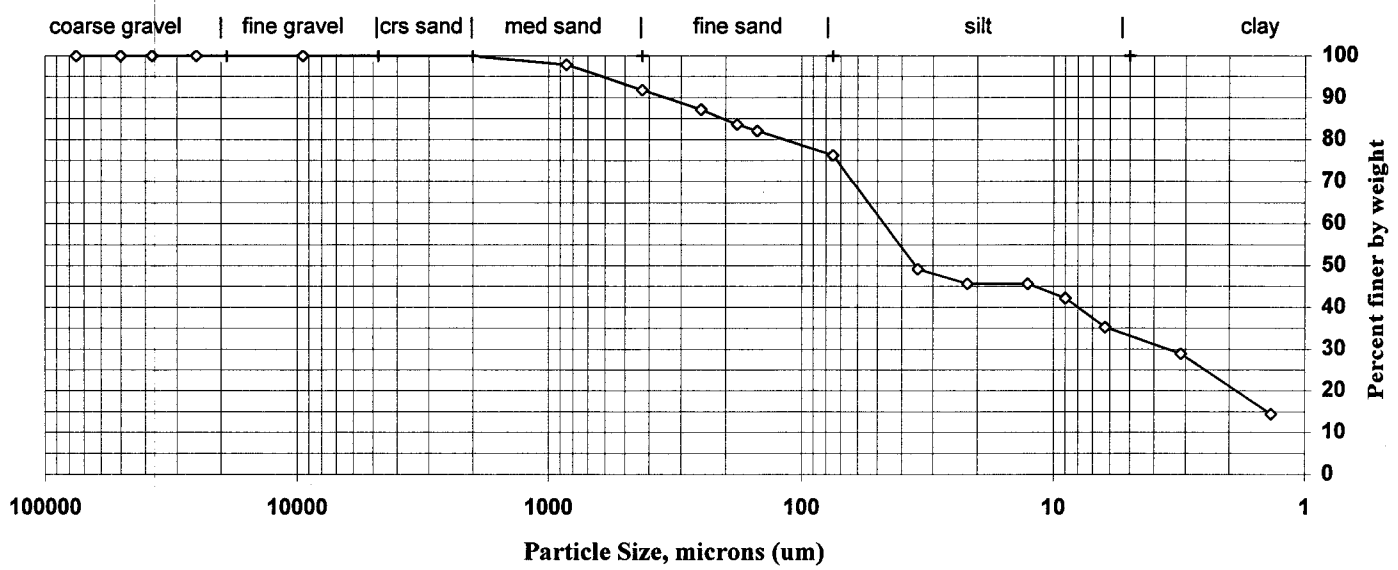
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536020 **Sample ID:** SSD-16

Percent Solids:	17.8%		**Maximum Particle Size:**	Crs sand	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	0.2%		**Hardness (> #10):**	soft	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	97.9	2.1
#40	425	91.8	6.0
#60	250	87.2	4.7
#80	180	83.5	3.6
#100	150	82.0	1.5
#200	75	76.2	5.8
Hydrometer	34.4	49.1	27.1
|	21.9	45.7	3.5
|	12.6	45.7	0.0
|	9.0	42.2	3.5
|	6.3	35.3	6.9
|	3.1	28.9	6.4
V	1.4	14.5	14.5

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	23.8
Coarse Sand	0.0
Medium Sand	8.1
Fine Sand	15.6
Silt	41.0
Clay	35.3

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

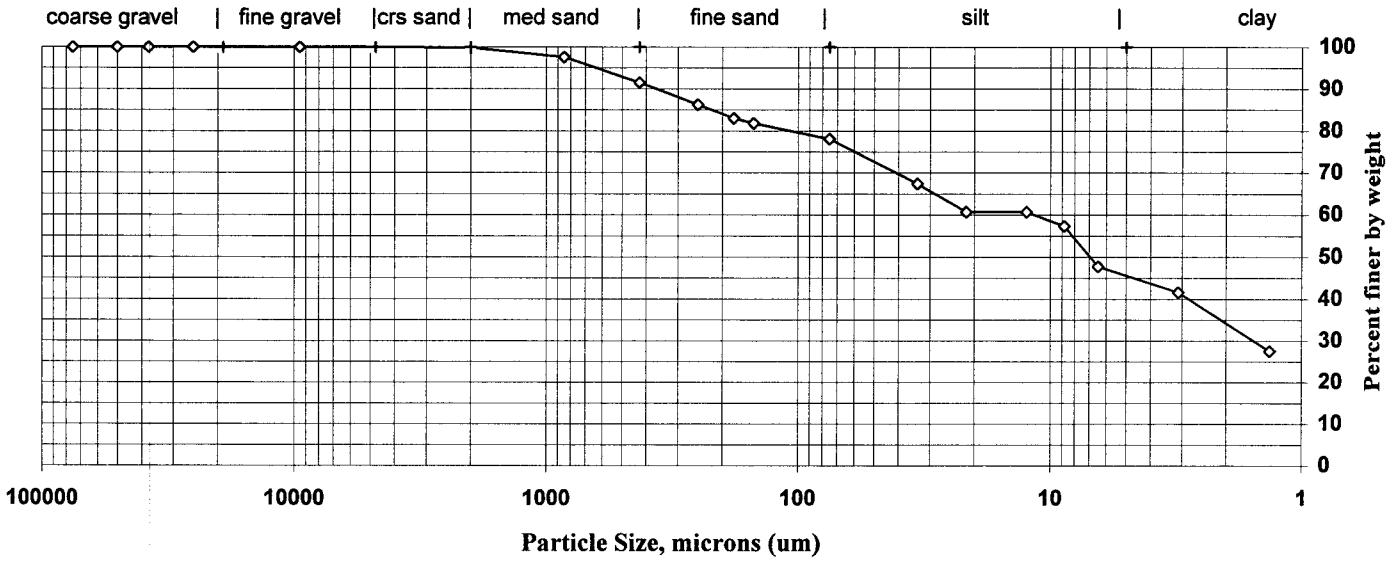
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536021 **Sample ID:** SSD-10

Percent Solids:	18.8%		**Maximum Particle Size:**	Crs sand
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	angular
Non-soil mass:	1.0%		**Hardness (> #10):**	hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	97.6	2.3
#40	425	91.5	6.1
#60	250	86.2	5.2
#80	180	83.0	3.3
#100	150	81.8	1.1
#200	75	78.0	3.8
Hydrometer	33.7	67.4	10.6
|	21.5	60.7	6.7
|	12.4	60.7	0.0
|	8.8	57.3	3.4
|	6.5	47.8	9.6
|	3.1	41.6	6.2
V	1.3	27.5	14.0

Soil Classification	Percent of Total Sample
Gravel	0.0
Sand	22.0
Coarse Sand	0.2
Medium Sand	8.4
Fine Sand	13.4
Silt	30.3
Clay	47.8

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

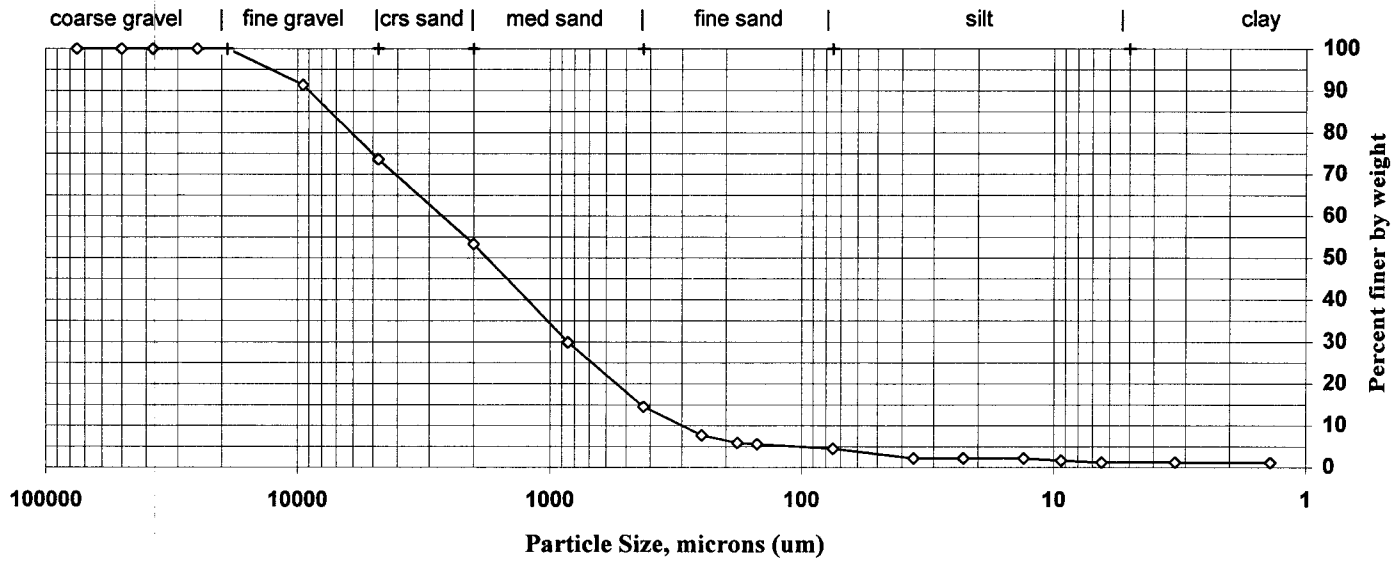
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536022 **Sample ID:** PSD-04

Percent Solids:	85.7%		**Maximum Particle Size:**	19 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	NA		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	91.4	8.6
#4	4750	73.6	17.7
#10	2000	53.3	20.3
#20	850	29.9	23.4
#40	425	14.5	15.4
#60	250	7.7	6.8
#80	180	5.9	1.8
#100	150	5.6	0.3
#200	75	4.5	1.1
Hydrometer	36.0	2.2	2.2
|	22.8	2.2	0.0
|	13.2	2.2	0.0
|	9.3	1.7	0.5
|	6.4	1.3	0.4
|	3.3	1.3	0.0
V	1.4	1.2	0.1

Soil Classification	Percent of Total Sample
Gravel	26.4
Sand	69.2
Coarse Sand	20.3
Medium Sand	38.8
Fine Sand	10.0
Silt	3.2
Clay	1.3

Dispersion Device: Mechanical mixer with a metal paddle.

Dispersion Period: 1 minute

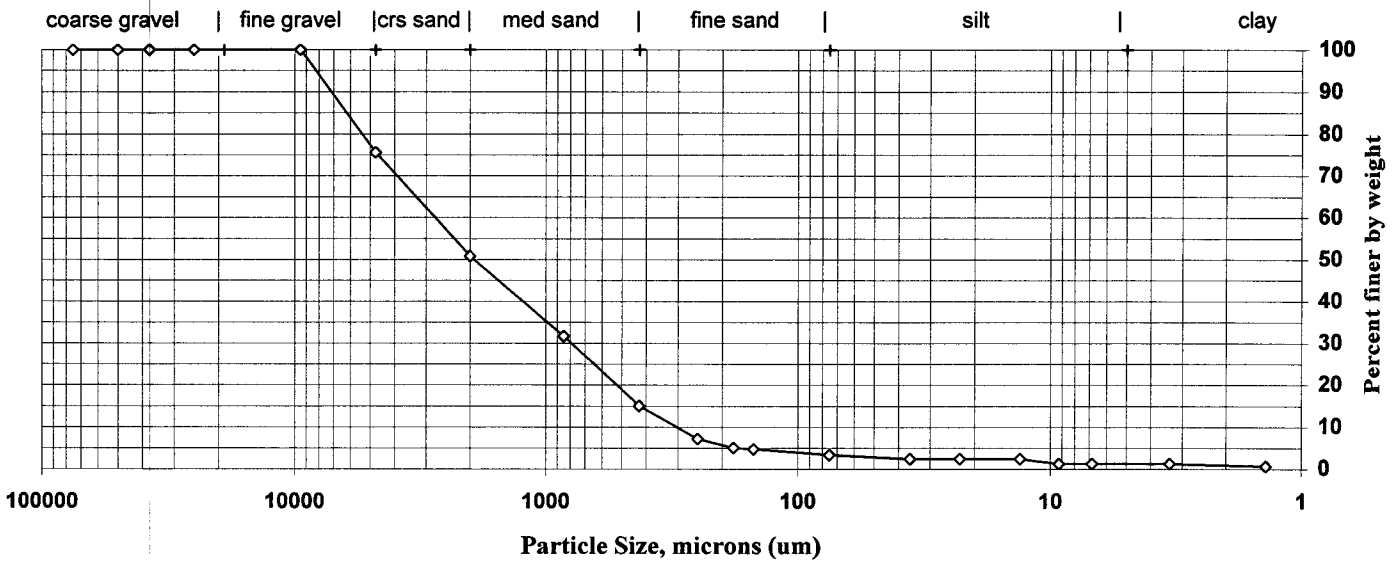
Particle Size of Soils by ASTM D422

Sample preparation method: **D2217**

Client:	EASEAT	**Project No.:**	23046	**ETR(s) #:**	95020
Client Code:	EASEAT	**Job No.:**	N/A	**SDG(s):**	GCD003
Date Received:	26-Jul-03	**Start Date:**	12-Aug-03	**End Date:**	22-Aug-03

Lab ID: 536023 **Sample ID:** RSD-04

Percent Solids:	83.4%		**Maximum Particle Size:**	9.5 mm	
Specific Gravity:	2.65	(assumed)	**Shape (> #10):**	subrounded	
Non-soil mass:	0.0%		**Hardness (> #10):**	hard	



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	75.6	24.4
#10	2000	50.8	24.8
#20	850	31.6	19.2
#40	425	15.0	16.6
#60	250	7.3	7.8
#80	180	5.1	2.2
#100	150	4.7	0.4
#200	75	3.3	1.4
Hydrometer	36.0	2.5	0.9
|	22.8	2.5	0.0
|	13.2	2.5	0.0
|	9.2	1.3	1.2
|	6.8	1.3	0.0
|	3.4	1.3	0.0
V	1.4	0.7	0.6

Soil Classification	Percent of Total Sample
Gravel	24.4
Sand	72.3
Coarse Sand	24.8
Medium Sand	35.8
Fine Sand	11.7
Silt	2.1
Clay	1.3

Dispersion Device: Mechanical mixer with a metal paddle.
Dispersion Period: 1 minute

STL Burlington
Colchester, Vermont

Sample Data Summary
Package

SDG: GCS002

SEVERN TRENT STL

September 23, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCS002

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 18 and 22, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/18/03 ETR No: 94855		
534799	SHERWPSUS23(3.5)	07/14/03	Soil
534800	SHERWPSUS23(3.5)SPLP	07/14/03	Extract
534801	CAPMWPSUS20(4.0)	07/15/03	Soil
534802	CAPMWPSUS20(4.0)SPLP	07/15/03	Extract
534803	CAPMWPSUS21(2.5)	07/15/03	Soil
534804	CAPMWPSUS21(2.5)SPLP	07/15/03	Extract
534805	CAPMTASUS22(1.5)	07/15/03	Soil
534806	SHERTASUS25(1.5)	07/14/03	Soil
534807	CAPMWPSUS39(2.0)	07/15/03	Soil
534808	CAPMWPSUS39(2.0)SPLP	07/15/03	Extract
534809	GRANBGSSS34(0.5)	07/15/03	Soil
534810	GRANBGSSS34(0.5)SPLP	07/15/03	Extract
534811	GRANBGSSS35(0.5)	07/15/03	Soil
534812	GRANBGSSS35(0.5)SPLP	07/15/03	Extract
534813	GRANBGSSS36(0.5)	07/15/03	Soil
534814	GRANBGSSS36(0.5)SPLP	07/15/03	Extract
	Received: 07/22/03 ETR No: 94964		
535438	AJAXWPSUS08(1.2)	07/17/03	Soil
535439	AJAXWPSUS08(1.2)SPLP	07/17/03	Extract
535440	AJAXWPSUS09(1.0)	07/17/03	Soil
535441	AJAXWPSUS09(1.0)SPLP	07/17/03	Extract
535442	MAGNTASSS15(0.5)	07/19/03	Soil
535443	MAGNTASSS15(0.5)SPLP	07/19/03	Extract

Severn Trent Laboratories, Inc.
STL Burlington • 208 South Park Drive, Suite 1, Colchester, VT 05446
Tel 802 655 1203 Fax 802 655 1248 • www.stl-inc.com

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Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94964 (Cont.)		
535444	MAGNTASSS15(0.5)(100)	07/19/03	Soil
535445	MAGNTASSS150.5100SPLP	07/19/03	Extract
535446	LUCABGSSS19(0.5)	07/19/03	Soil
535447	LUCABGSSS19(0.5)SPLP	07/19/03	Extract
535448	MAGNTASUS18(1.5)	07/18/03	Soil
535449	MAGNPDSSS12(0.3)	07/18/03	Soil
535450	MAGNWPSSS16(0.5)	07/18/03	Soil
535451	MAGNWPSSS16(0.5)SPLP	07/18/03	Extract
535452	AJAXWPSUS10(2.0)	07/18/03	Soil
535453	AJAXWPSUS10(2.0)SPLP	07/18/03	Extract
535454	MAGNWPSUS14(3.0)	07/18/03	Soil
535454MS	MAGNWPSUS14(3.0)MS	07/18/03	Soil
535454DP	MAGNWPSUS14(3.0)REP	07/18/03	Soil
535455	MAGNWPSUS14(3.0)SPLP	07/18/03	Extract
535455MS	MAGNWPSUS143.0SPLPMS	07/18/03	Extract
535455DP	MAGNWPSUS143.0SPLPREP	07/18/03	Extract
535456	MAGNWPSUS17(2.0)	07/18/03	Soil
535457	MAGNWPSUS17(2.0)SPLP	07/18/03	Extract

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed. Please note that the "SPLP" suffix refers to the lab generated Synthetic Precipitation Leachate Procedure (SPLP) extract.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal. Please note the one of the containers for samples AJAXWPSUS08(1.2) and MAGNWPSUS14(3.0) were received broken but intact. The laboratory transferred all contents to clean containers upon arrival.

The analysis for hexavalent chromium was performed by STL's Chicago facility, as approved by EA Engineering. STL Chicago assigned "Lot" numbers as samples were received. Though laboratory numbers may differ, the client's sample identifications were maintained. The results for this delivery group including a case narrative prepared by the Chicago laboratory can be found at the end of the extended submittal.

The analysis for acid base accounting (ABA) was performed by BC Research Inc. Please note that the ABA results for these samples were included in SDG GCS003. These samples were inadvertently consolidated with that shipment.

Metals by ICP / CVAA

The percent difference between the original determinations and serial dilution determinations for beryllium (17.6%), calcium (12.4%), lead (14.0%), magnesium (12.5%), potassium (19.9%) and zinc (13.1%) in sample MAGNWPSUS14(3.0) were above the control criteria of ±10%. Matrix interference is suspected and results have been flagged with an "E" accordingly.

The recoveries of antimony (22.2%), selenium (61.7%), and zinc (22.8%) from the laboratory fortified aliquot of sample MAGNWPSUS14(3.0) were below the laboratory control limit of 75-125%. Corresponding sample results have been flagged with an "N". Recovery from the laboratory control samples proved acceptable. Recovery from the post digestate spike of this same sample proved acceptable.

The relative percent differences (RPDs) between the initial and duplicate analysis of sample MAGNWPSUS14(3.0) for barium (70.7%), calcium (22.5%), lead (21.1%), magnesium (35.8%) and mercury (56.7%) were above the established control limit of ±20 percent. Corresponding sample results have been flagged with a "*" to denote this anomaly.

Please note that the following samples displayed a slight negative interference (concentration less than 0 but greater than −10 ppb) for cadmium: AJAXWPSUS08(1.2), MAGNWPSSS16(0.5), and MAGNWPSUS14(3.0).

For the analysis performed on ICP6 on August 28, 2003, the second continuing calibration blank failed slightly high for manganese (110.8%). The laboratory noted that all sample results reported for manganese from this analytical run were those that required dilutions for this element.

Reportable concentrations of the following metals were detected in one or more of the SPLP preparation blanks associated with this delivery group: lead, sodium, and zinc. The laboratory noted that the digestion preparation blanks associated with the above samples did not contain metals in concentrations greater than their respective reporting limits.

Please note that not all elements were included in the matrix spiking solution for the SPLP extract. The routine protocol of spiking with only the Toxicity Characteristic Leachate Procedure (TCLP) / SEM elements was followed. The spiking solution thus contained arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver plus copper and zinc.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0855.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

0002-D LAST ALPHA

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd. Suite 200
Bellevue, WA 98005
Contacts: Jen Kindred
Phone: 425 451 7400
Fax:
Contract/
Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Sampler's Name: James Gaitheror
Sampler's Signature:

Proj. No.: 13890.13
Project Name: GRANITE CREEK WATERSHED MINES

ANALYSIS REQUESTED: pH; TAL Metals; CN; SPLP; ABA

Lab Use Only
Due Date:
Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5
Custody Seal N / Y
Intact N / Y
Screened For Radioactivity ☐

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	pH	TAL Metals	CN	SPLP	ABA	Lab/Sample ID (Lab Use Only)
S	7/14/03	1330		X	SHER-WP-SOS-23 (3,5)			2		X	X	X	X	X	
S	7/15/03	1035		X	CAPM-WP-SOS-20 (4.0)			2		X	X	X	X	X	
S	7/15/03	1135		X	CAPM-WP-SOS-21 (2,5)			2		X	X	X	X	X	
S	7/15/03	1400		X	CAPM-TA-SOS-22 (1,5)			1		X	X	X			
S	7/14/03	1330		X	SHER-TA-SOS-25 (1,5)			1		X	X	X			
S	7/15/03	1305		X	CAPM-WP-SOS-39 (2,0)			2		X	X	X	X	X	
S	7/15/03	1657		X	GRAN-BG-SSS-34 (0,5)			2		X	X	X	X	X	
S	7/15/03	1657		X	GRAN-BG-SSS-35 (0,5)			2		X	X	X	X	X	
S	7/15/03	1744		X	GRAN-BG-SSS-36 (0,5)			2		X	X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
	7/16/03	1500		7/18/03	1000
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

STL cannot accept verbal changes.
Please Fax written changes to
(802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**
SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Soil

p 1 of 2

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: Same
Address: 12011 Bel-Red Rd Bellevue, WA 98	Address:
Contact: Jen Kindred	Contact:
Phone: 425 451-7400	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Sampler's Name: James Gatherer

Sampler's Signature:

Proj. No.: 13890.13

Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	pH	TAL Metals	CN	ORP	ABA	Chromium VI	Lab/Sample ID (Lab Use Only)
S	7/17/03	1115		X	AJAX-WP-SUS-08 (1.2)			2		X	X	X	X	X	X	
S	7/17/03	1250		X	AJAX-WP-SUS-09 (1.0)			2		X	X	X	X	X	X	
					~~AJAX-PD-SSD-06~~											
S	7/19/03	1415		X	MAGN-TA-SSS-15 (0.5)			2		X	X	X	X	X	X	
S	7/19/03	1420		X	MAGN-TA-SSS-15 (0.5)(100)			2		X	X	X	X	X	X	
S	7/19/03	1330		X	LUCA-BG-SSS-19 (0.5)			2		X	X	X	X	X	X	
S	7/18/03	1445		X	MAGN-TA-SUS-18 (1.5)			1		X	X	X			X	
S	7/18/03	1600		X	MAGN-PD-SSS-12 (0.3)			1		X	X	X			X	
S	7/18/03	1420		X	MAGN-WP-SSS-16 (0.5)			2		X	X	X	X	X	X	
S	7/18/03	1320		X	~~MAGN-WP-SUS-14 (3.0)~~			2		X	X	X	X	X		

Lab Use Only
Due Date:

Temp. of coolers when received (C°):

1	2	3	4	5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Jen Kindred	7-21-03	0800		7/22/03	1070
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube Sl - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**
SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

Soil p 2 of 2

CHAIN OF CUSTODY RECORD

Report to:
Company: See p. 1 - EA
Address: 12011 Bel-Red Rd Suite 200 Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: See p. 1
Address:
Contact:
Phone:
Fax:

Sampler's Name: James Gothener
Sampler's Signature:

Proj. No.: see p 1
Project Name: See p 1

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	pH	TAL Metals	CN	SPLP	ABA	Chromium VI	Lab/Sample ID (Lab Use Only)
S	7/18/03	1240		X	AJAX-WP-SUS-10 (2.0)			2		X	X	X	X	X	X	
S	7/18/03	1320		X	MAGN-WP-SUS-14 (3.0) MS			4 2		X	X	X	X	X	X	MS
S	7/18/03	1535		X	MAGN-WP-SUS-17 (2.0)			2		X	X	X	X	X	X	

Analysis Requested

Lab Use Only
Due Date:

Temp. of coolers when received (C°):
1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
	7-21-03	0800		7/22/03	1070
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other _____

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.
SHERWPSUS23(3.5)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534799

Matrix: SOIL
Client: EASEAT
Date Received: 07/18/03

% Solids: 93.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.0	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		93.0	

Printed on: 09/04/03 05:22 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

CAPMWPSUS20(4.0)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534801

Matrix: SOIL | Client: EASEAT | Date Received: 07/18/03

% Solids: 91.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.4	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		91.2	

Printed on: 09/04/03 05:22 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
CAPMWPSUS21(2.5)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534803

Matrix: SOIL
Client: EASEAT
Date Received: 07/18/03

% Solids: 92.8

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	8.0	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		92.8	

Printed on: 09/04/03 05:23 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

CAPMTASUS22(1.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534805

Matrix: SOIL | Client: EASEAT | Date Received: 07/18/03

% Solids: 86.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.1	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		86.5	

Printed on: 09/04/03 05:23 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
SHERTASUS25(1.5)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534806

Matrix: SOIL
Client: EASEAT
Date Received: 07/18/03

% Solids: 93.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	6.8	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		93.0	

Printed on: 09/04/03 05:23 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
CAPMWPSUS39(2.0)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534807

Matrix: SOIL
Client: EASEAT
Date Received: 07/18/03

% Solids: 91.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	4.9	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		91.4	

Printed on: 09/04/03 05:24 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

GRANBGSSS34(0.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534809

Matrix: SOIL | Client: EASEAT | Date Received: 07/18/03

% Solids: 78.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	6.4	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		78.1	

Printed on: 09/04/03 05:24 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

GRANBGSSS35(0.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534811

Matrix: SOIL | Client: EASEAT | Date Received: 07/18/03

% Solids: 73.7

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	6.7	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		73.7	

Printed on: 09/04/03 05:24 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

GRANBGSSS36(0.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534813

Matrix: SOIL | Client: EASEAT | Date Received: 07/18/03

% Solids: 91.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	6.6	
IN623	Solids, Percent	07/22/03	N/A	%	1.0		91.6	

Printed on: 09/04/03 05:25 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

AJAXWPSUS08(1.2)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535438

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 89.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.8	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		89.6	

Printed on: 09/04/03 05:25 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

AJAXWPSUS09(1.0)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535440

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 95.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	8.2	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		95.1	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNTASSS15(0.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535442

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 93.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	4.5	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		93.6	

Printed on: 09/04/03 05:26 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNTASSS15(0.5)(100)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535444

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 93.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	4.5	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		93.9	

Printed on: 09/04/03 05:26 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
LUCABGSSS19(0.5)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535446

Matrix: SOIL
Client: EASEAT
Date Received: 07/22/03

% Solids: 92.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	5.9	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		92.5	

Printed on: 09/04/03 05:27 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNTASUS18(1.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535448

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 92.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.2	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		92.4	

Printed on: 09/04/03 05:27 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNPDSSS12(0.3)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535449

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 31.3

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.7	
IN623	Solids, Percent	07/31/03	N/A	%	1.0		31.3	

Printed on: 09/04/03 05:27 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNWPSSS16(0.5)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535450

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 91.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	2.7	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		91.0	

Printed on: 09/04/03 05:28 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXWPSUS10(2.0)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535452

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 92.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	3.9	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		92.1	

Printed on: 09/04/03 05:29 PM

WET CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.
MAGNWPSUS14(3.0)REP

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535454DP

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 89.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Sample Result Qual.	Duplicate Sample Result Conc.	Duplicate Sample Result Qual.	RPD*
9040B	Corrosivity by pH	07/26/03		pH	5.7		5.7		0
IN623	Solids, Percent	07/29/03	N/A	%	88.4		89.1		1

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/04/03 05:29 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNWPSUS14(3.0)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCS002

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535454

Matrix: SOIL
Client: EASEAT
Date Received: 07/22/03

% Solids: 88.4

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	5.7	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		88.4	

Printed on: 09/04/03 05:30 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNWPSUS17(2.0)

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535456

Matrix: SOIL | Client: EASEAT | Date Received: 07/22/03

% Solids: 95.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
9040B	Corrosivity by pH	07/26/03		pH	1	0.000	7.7	
IN623	Solids, Percent	07/29/03	N/A	%	1.0		95.0	

Printed on: 09/04/03 05:31 PM

WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCS002

Lab Code: STLVT | Case No.: 23046

Matrix: SOIL | Client: EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCSPH0726A	9040B	Corrosivity by pH	07/26/03		pH	6.0	6.0000	100.5

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

Printed on: 09/04/03 05:32 PM

WET CHEMISTRY

Laboratory Control Sample Duplicate
Report Summary

Lab Name: STL BURLINGTON Contract: SDG No.: GCS002

Lab Code: STLVT Case No.: 23046

Matrix: SOIL Client: EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCSD Conc.	True Value	% Recovery*	RPD**
LCSDPH0726A	9040B	Corrosivity by pH	07/26/03		pH	6.0	6.0000	100.3	0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*
*** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/04/03 05:32 PM

SEVERN TRENT STL

Sample Data Summary Package For Metals

USEPA-CLP FORMS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
AJAXWPSUS08(1.2)	535438
AJAXWPSUS09(1.0)	535440
AJAXWPSUS10(2.0)	535452
CAPMTASUS22(1.5)	534805
CAPMWPSUS20(4.0)	534801
CAPMWPSUS21(2.5)	534803
CAPMWPSUS39(2.0)	534807
GRANBGSSS34(0.5)	534809
GRANBGSSS35(0.5)	534811
GRANBGSSS36(0.5)	534813
LUCABGSSS19(0.5)	535446
MAGNPDSSS12(0.3)	535449
MAGNTASSS15(0.5)	535442
MAGNTASSS15(0.5)(100)	535444
MAGNTASUS18(1.5)	535448
MAGNWPSSS16(0.5)	535450
MAGNWPSUS14(3.0)	535454
MAGNWPSUS14(3.0)D	535454DP
MAGNWPSUS14(3.0)S	535454MS
MAGNWPSUS17(2.0)	535456
SHERTASUS25(1.5)	534806
SHERWPSUS23(3.5)	534799

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS08(1.2)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535438

Level (low/med): LOW Date Received: 07/22/03

% Solids: 89.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3870			P
7440-36-0	Antimony	6.2		N	P
7440-38-2	Arsenic	411			P
7440-39-3	Barium	25.5		*	P
7440-41-7	Beryllium	0.59		E	P
7440-43-9	Cadmium	0.030	U		P
7440-70-2	Calcium	5800		E*	P
7440-47-3	Chromium	14.3			P
7440-48-4	Cobalt	14.6			P
7440-50-8	Copper	58.7			P
7439-89-6	Iron	37500			P
7439-92-1	Lead	8.4		E*	P
7439-95-4	Magnesium	3600		E*	P
7439-96-5	Manganese	1700			P
7439-97-6	Mercury	1.2		*	CV
7440-02-0	Nickel	27.4			P
7440-09-7	Potassium	1430		E	P
7782-49-2	Selenium	1.6		N	P
7440-22-4	Silver	0.77	B		P
7440-23-5	Sodium	39.6	B		P
7440-28-0	Thallium	2.6			P
7440-62-2	Vanadium	19.4			P
7440-66-6	Zinc	71.0		NE	P
57-12-5	Cyanide	0.42	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS09(1.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535440

Level (low/med): LOW Date Received: 07/22/03

% Solids: 95.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2660			P
7440-36-0	Antimony	3.3	B	N	P
7440-38-2	Arsenic	154			P
7440-39-3	Barium	38.7		*	P
7440-41-7	Beryllium	0.46		E	P
7440-43-9	Cadmium	0.025	U		P
7440-70-2	Calcium	25100		E*	P
7440-47-3	Chromium	8.0			P
7440-48-4	Cobalt	7.8			P
7440-50-8	Copper	67.9			P
7439-89-6	Iron	23400			P
7439-92-1	Lead	5.0		E*	P
7439-95-4	Magnesium	9600		E*	P
7439-96-5	Manganese	2130			P
7439-97-6	Mercury	1.9		*	CV
7440-02-0	Nickel	22.7			P
7440-09-7	Potassium	1990		E	P
7782-49-2	Selenium	0.96		N	P
7440-22-4	Silver	0.32	B		P
7440-23-5	Sodium	145	B		P
7440-28-0	Thallium	2.4			P
7440-62-2	Vanadium	15.1			P
7440-66-6	Zinc	47.3		NE	P
57-12-5	Cyanide	0.50	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS10(2.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535452

Level (low/med): LOW Date Received: 07/22/03

% Solids: 92.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18800			P
7440-36-0	Antimony	1.6	B	N	P
7440-38-2	Arsenic	95.7			P
7440-39-3	Barium	186		*	P
7440-41-7	Beryllium	0.89		E	P
7440-43-9	Cadmium	0.025	U		P
7440-70-2	Calcium	985		E*	P
7440-47-3	Chromium	39.5			P
7440-48-4	Cobalt	16.8			P
7440-50-8	Copper	84.7			P
7439-89-6	Iron	35500			P
7439-92-1	Lead	9.7		E*	P
7439-95-4	Magnesium	4260		E*	P
7439-96-5	Manganese	762			P
7439-97-6	Mercury	0.43		*	CV
7440-02-0	Nickel	26.8			P
7440-09-7	Potassium	3730		E	P
7782-49-2	Selenium	1.1		N	P
7440-22-4	Silver	1.4			P
7440-23-5	Sodium	714			P
7440-28-0	Thallium	1.5			P
7440-62-2	Vanadium	65.8			P
7440-66-6	Zinc	87.4		NE	P
57-12-5	Cyanide	0.52	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMTASUS22(1.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534805

Level (low/med): LOW Date Received: 07/18/03

% Solids: 86.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	12500			P
7440-36-0	Antimony	0.68	B	N	P
7440-38-2	Arsenic	6.3			P
7440-39-3	Barium	155		*	P
7440-41-7	Beryllium	0.38	B	E	P
7440-43-9	Cadmium	0.030	U		P
7440-70-2	Calcium	1940		E*	P
7440-47-3	Chromium	5.2			P
7440-48-4	Cobalt	8.0			P
7440-50-8	Copper	3.3			P
7439-89-6	Iron	16300			P
7439-92-1	Lead	2.8		E*	P
7439-95-4	Magnesium	5180		E*	P
7439-96-5	Manganese	408			P
7439-97-6	Mercury	0.058		*	CV
7440-02-0	Nickel	3.8	B		P
7440-09-7	Potassium	3720		E	P
7782-49-2	Selenium	0.24	B	N	P
7440-22-4	Silver	0.28	B		P
7440-23-5	Sodium	982			P
7440-28-0	Thallium	0.28	U		P
7440-62-2	Vanadium	40.6			P
7440-66-6	Zinc	41.8		NE	P
57-12-5	Cyanide	0.56	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS20(4.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534801

Level (low/med): LOW Date Received: 07/18/03

% Solids: 91.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	15600			P
7440-36-0	Antimony	0.38	B	N	P
7440-38-2	Arsenic	10.1			P
7440-39-3	Barium	180		*	P
7440-41-7	Beryllium	0.48		E	P
7440-43-9	Cadmium	0.027	U		P
7440-70-2	Calcium	2850		E*	P
7440-47-3	Chromium	8.4			P
7440-48-4	Cobalt	9.1			P
7440-50-8	Copper	5.5			P
7439-89-6	Iron	19700			P
7439-92-1	Lead	3.6		E*	P
7439-95-4	Magnesium	5320		E*	P
7439-96-5	Manganese	270			P
7439-97-6	Mercury	0.026	B	*	CV
7440-02-0	Nickel	4.3			P
7440-09-7	Potassium	4080		E	P
7782-49-2	Selenium	0.31	U	N	P
7440-22-4	Silver	0.63	B		P
7440-23-5	Sodium	1100			P
7440-28-0	Thallium	0.25	U		P
7440-62-2	Vanadium	52.2			P
7440-66-6	Zinc	48.6		NE	P
57-12-5	Cyanide	0.54	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS21(2.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534803

Level (low/med): LOW Date Received: 07/18/03

% Solids: 92.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10400			P
7440-36-0	Antimony	2.0	B	N	P
7440-38-2	Arsenic	198			P
7440-39-3	Barium	177		*	P
7440-41-7	Beryllium	0.50		E	P
7440-43-9	Cadmium	14.1			P
7440-70-2	Calcium	6320		E*	P
7440-47-3	Chromium	5.5			P
7440-48-4	Cobalt	7.4			P
7440-50-8	Copper	43.5			P
7439-89-6	Iron	20700			P
7439-92-1	Lead	44.1		E*	P
7439-95-4	Magnesium	2980		E*	P
7439-96-5	Manganese	504			P
7439-97-6	Mercury	0.30		*	CV
7440-02-0	Nickel	4.1			P
7440-09-7	Potassium	3240		E	P
7782-49-2	Selenium	0.40	B	N	P
7440-22-4	Silver	4.2			P
7440-23-5	Sodium	122	B		P
7440-28-0	Thallium	0.45	B		P
7440-62-2	Vanadium	33.9			P
7440-66-6	Zinc	495		NE	P
57-12-5	Cyanide	0.54	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS39(2.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534807

Level (low/med): LOW Date Received: 07/18/03

% Solids: 91.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14900			P
7440-36-0	Antimony	0.61	B	N	P
7440-38-2	Arsenic	17.5			P
7440-39-3	Barium	167		*	P
7440-41-7	Beryllium	0.44		E	P
7440-43-9	Cadmium	0.025	U		P
7440-70-2	Calcium	905		E*	P
7440-47-3	Chromium	9.7			P
7440-48-4	Cobalt	9.6			P
7440-50-8	Copper	11.0			P
7439-89-6	Iron	19600			P
7439-92-1	Lead	4.2		E*	P
7439-95-4	Magnesium	4560		E*	P
7439-96-5	Manganese	321			P
7439-97-6	Mercury	0.064		*	CV
7440-02-0	Nickel	4.8			P
7440-09-7	Potassium	3560		E	P
7782-49-2	Selenium	0.40	B	N	P
7440-22-4	Silver	0.79	B		P
7440-23-5	Sodium	1060			P
7440-28-0	Thallium	0.23	U		P
7440-62-2	Vanadium	52.2			P
7440-66-6	Zinc	50.5		NE	P
57-12-5	Cyanide	0.54	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS34(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534809

Level (low/med): LOW Date Received: 07/18/03

% Solids: 78.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	26400			P
7440-36-0	Antimony	0.38	U	N	P
7440-38-2	Arsenic	3.4			P
7440-39-3	Barium	187		*	P
7440-41-7	Beryllium	0.72		E	P
7440-43-9	Cadmium	0.35	B		P
7440-70-2	Calcium	1130		E*	P
7440-47-3	Chromium	5.7			P
7440-48-4	Cobalt	5.5			P
7440-50-8	Copper	8.9			P
7439-89-6	Iron	10800			P
7439-92-1	Lead	3.8		E*	P
7439-95-4	Magnesium	880		E*	P
7439-96-5	Manganese	429			P
7439-97-6	Mercury	0.032	B	*	CV
7440-02-0	Nickel	5.2			P
7440-09-7	Potassium	848		E	P
7782-49-2	Selenium	0.61		N	P
7440-22-4	Silver	0.28	B		P
7440-23-5	Sodium	1220			P
7440-28-0	Thallium	0.28	U		P
7440-62-2	Vanadium	24.9			P
7440-66-6	Zinc	50.2		NE	P
57-12-5	Cyanide	0.63	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS35(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534811

Level (low/med): LOW Date Received: 07/18/03

% Solids: 73.7

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	31200			P
7440-36-0	Antimony	0.40	U	N	P
7440-38-2	Arsenic	5.5			P
7440-39-3	Barium	268		*	P
7440-41-7	Beryllium	1.0		E	P
7440-43-9	Cadmium	0.54			P
7440-70-2	Calcium	2110		E*	P
7440-47-3	Chromium	6.2			P
7440-48-4	Cobalt	6.7			P
7440-50-8	Copper	15.4			P
7439-89-6	Iron	12400			P
7439-92-1	Lead	5.9		E*	P
7439-95-4	Magnesium	1560		E*	P
7439-96-5	Manganese	156			P
7439-97-6	Mercury	0.035	B	*	CV
7440-02-0	Nickel	5.6			P
7440-09-7	Potassium	1140		E	P
7782-49-2	Selenium	0.42	B	N	P
7440-22-4	Silver	0.62	B		P
7440-23-5	Sodium	1450			P
7440-28-0	Thallium	0.29	U		P
7440-62-2	Vanadium	26.5			P
7440-66-6	Zinc	43.2		NE	P
57-12-5	Cyanide	0.68	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS36(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534813

Level (low/med): LOW Date Received: 07/18/03

% Solids: 91.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	19400			P
7440-36-0	Antimony	0.33	U	N	P
7440-38-2	Arsenic	11.4			P
7440-39-3	Barium	319		*	P
7440-41-7	Beryllium	0.55		E	P
7440-43-9	Cadmium	0.026	U		P
7440-70-2	Calcium	2080		E*	P
7440-47-3	Chromium	27.4			P
7440-48-4	Cobalt	10.2			P
7440-50-8	Copper	11.0			P
7439-89-6	Iron	17700			P
7439-92-1	Lead	6.3		E*	P
7439-95-4	Magnesium	4930		E*	P
7439-96-5	Manganese	610			P
7439-97-6	Mercury	0.027	B	*	CV
7440-02-0	Nickel	23.4			P
7440-09-7	Potassium	3920		E	P
7782-49-2	Selenium	0.24	B	N	P
7440-22-4	Silver	0.48	B		P
7440-23-5	Sodium	1180			P
7440-28-0	Thallium	0.24	U		P
7440-62-2	Vanadium	47.2			P
7440-66-6	Zinc	61.3		NE	P
57-12-5	Cyanide	0.55	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
LUCABGSSS19(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535446

Level (low/med): LOW Date Received: 07/22/03

% Solids: 92.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24400			P
7440-36-0	Antimony	0.84	B	N	P
7440-38-2	Arsenic	4.5			P
7440-39-3	Barium	288		*	P
7440-41-7	Beryllium	1.2		E	P
7440-43-9	Cadmium	0.43	B		P
7440-70-2	Calcium	1830		E*	P
7440-47-3	Chromium	31.3			P
7440-48-4	Cobalt	11.3			P
7440-50-8	Copper	30.7			P
7439-89-6	Iron	24600			P
7439-92-1	Lead	8.4		E*	P
7439-95-4	Magnesium	2630		E*	P
7439-96-5	Manganese	837			P
7439-97-6	Mercury	0.14		*	CV
7440-02-0	Nickel	23.4			P
7440-09-7	Potassium	1570		E	P
7782-49-2	Selenium	0.76		N	P
7440-22-4	Silver	0.26	B		P
7440-23-5	Sodium	806			P
7440-28-0	Thallium	0.97			P
7440-62-2	Vanadium	47.8			P
7440-66-6	Zinc	105		NE	P
57-12-5	Cyanide	0.54	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNPDSSS12(0.3)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535449

Level (low/med): LOW Date Received: 07/22/03

% Solids: 31.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	14000			P
7440-36-0	Antimony	17.1		N	P
7440-38-2	Arsenic	3730			P
7440-39-3	Barium	273		*	P
7440-41-7	Beryllium	3.4		E	P
7440-43-9	Cadmium	16.9			P
7440-70-2	Calcium	19200		E*	P
7440-47-3	Chromium	22.0			P
7440-48-4	Cobalt	301			P
7440-50-8	Copper	310			P
7439-89-6	Iron	139000			P
7439-92-1	Lead	151		E*	P
7439-95-4	Magnesium	4540		E*	P
7439-96-5	Manganese	34300			P
7439-97-6	Mercury	9.0		*	CV
7440-02-0	Nickel	888			P
7440-09-7	Potassium	3180		E	P
7782-49-2	Selenium	11.6		N	P
7440-22-4	Silver	12.1			P
7440-23-5	Sodium	54.2	U		P
7440-28-0	Thallium	36.3			P
7440-62-2	Vanadium	34.2			P
7440-66-6	Zinc	1620		NE	P
57-12-5	Cyanide	4.9			AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNTASSS15(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535442

Level (low/med): LOW Date Received: 07/22/03

% Solids: 93.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3300			P
7440-36-0	Antimony	17.6		N	P
7440-38-2	Arsenic	828			P
7440-39-3	Barium	72.5		*	P
7440-41-7	Beryllium	0.18	B	E	P
7440-43-9	Cadmium	0.56			P
7440-70-2	Calcium	821		E*	P
7440-47-3	Chromium	5.0			P
7440-48-4	Cobalt	3.6	B		P
7440-50-8	Copper	35.4			P
7439-89-6	Iron	24700			P
7439-92-1	Lead	524		E*	P
7439-95-4	Magnesium	1060		E*	P
7439-96-5	Manganese	130			P
7439-97-6	Mercury	9.4		*	CV
7440-02-0	Nickel	6.7			P
7440-09-7	Potassium	2280		E	P
7782-49-2	Selenium	3.7		N	P
7440-22-4	Silver	37.2			P
7440-23-5	Sodium	152	B		P
7440-28-0	Thallium	1.9			P
7440-62-2	Vanadium	30.5			P
7440-66-6	Zinc	73.0		NE	P
57-12-5	Cyanide	0.53	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNTASSS15(0.5)(100)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535444

Level (low/med): LOW Date Received: 07/22/03

% Solids: 93.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	4690			P
7440-36-0	Antimony	41.6		N	P
7440-38-2	Arsenic	1130			P
7440-39-3	Barium	197		*	P
7440-41-7	Beryllium	0.14	B	E	P
7440-43-9	Cadmium	0.16	B		P
7440-70-2	Calcium	864		E*	P
7440-47-3	Chromium	12.1			P
7440-48-4	Cobalt	4.8			P
7440-50-8	Copper	43.7			P
7439-89-6	Iron	36000			P
7439-92-1	Lead	846		E*	P
7439-95-4	Magnesium	1800		E*	P
7439-96-5	Manganese	195			P
7439-97-6	Mercury	8.6		*	CV
7440-02-0	Nickel	8.6			P
7440-09-7	Potassium	3940		E	P
7782-49-2	Selenium	5.5		N	P
7440-22-4	Silver	34.1			P
7440-23-5	Sodium	277	B		P
7440-28-0	Thallium	3.0			P
7440-62-2	Vanadium	41.0			P
7440-66-6	Zinc	73.1		NE	P
57-12-5	Cyanide	0.47	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNTASUS18(1.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535448

Level (low/med): LOW Date Received: 07/22/03

% Solids: 92.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23200			P
7440-36-0	Antimony	0.97	B	N	P
7440-38-2	Arsenic	32.6			P
7440-39-3	Barium	328		*	P
7440-41-7	Beryllium	1.1		E	P
7440-43-9	Cadmium	0.025	U		P
7440-70-2	Calcium	1040		E*	P
7440-47-3	Chromium	24.4			P
7440-48-4	Cobalt	14.1			P
7440-50-8	Copper	40.2			P
7439-89-6	Iron	26800			P
7439-92-1	Lead	9.8		E*	P
7439-95-4	Magnesium	4570		E*	P
7439-96-5	Manganese	614			P
7439-97-6	Mercury	0.12		*	CV
7440-02-0	Nickel	18.8			P
7440-09-7	Potassium	5260		E	P
7782-49-2	Selenium	0.67		N	P
7440-22-4	Silver	0.48	B		P
7440-23-5	Sodium	869			P
7440-28-0	Thallium	0.96			P
7440-62-2	Vanadium	72.8			P
7440-66-6	Zinc	91.4		NE	P
57-12-5	Cyanide	0.49	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSSS16(0.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535450

Level (low/med): LOW Date Received: 07/22/03

% Solids: 91.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	6740			P
7440-36-0	Antimony	5.7		N	P
7440-38-2	Arsenic	317			P
7440-39-3	Barium	70.0		*	P
7440-41-7	Beryllium	0.42	B	E	P
7440-43-9	Cadmium	0.028	U		P
7440-70-2	Calcium	2330		E*	P
7440-47-3	Chromium	11.2			P
7440-48-4	Cobalt	5.8			P
7440-50-8	Copper	50.2			P
7439-89-6	Iron	30500			P
7439-92-1	Lead	17.0		E*	P
7439-95-4	Magnesium	1140		E*	P
7439-96-5	Manganese	193			P
7439-97-6	Mercury	0.88		*	CV
7440-02-0	Nickel	13.0			P
7440-09-7	Potassium	2610		E	P
7782-49-2	Selenium	1.6		N	P
7440-22-4	Silver	2.2			P
7440-23-5	Sodium	173	B		P
7440-28-0	Thallium	1.2			P
7440-62-2	Vanadium	43.3			P
7440-66-6	Zinc	56.2		NE	P
57-12-5	Cyanide	0.53	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSUS14(3.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535454

Level (low/med): LOW Date Received: 07/22/03

% Solids: 88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7290			P
7440-36-0	Antimony	10.6		N	P
7440-38-2	Arsenic	1220			P
7440-39-3	Barium	131		*	P
7440-41-7	Beryllium	1.2		E	P
7440-43-9	Cadmium	0.027	U		P
7440-70-2	Calcium	11900		E*	P
7440-47-3	Chromium	10.8			P
7440-48-4	Cobalt	18.0			P
7440-50-8	Copper	61.2			P
7439-89-6	Iron	75700			P
7439-92-1	Lead	31.7		E*	P
7439-95-4	Magnesium	3400		E*	P
7439-96-5	Manganese	2350			P
7439-97-6	Mercury	1.8		*	CV
7440-02-0	Nickel	17.1			P
7440-09-7	Potassium	2750		E	P
7782-49-2	Selenium	2.4		N	P
7440-22-4	Silver	4.0			P
7440-23-5	Sodium	168	B		P
7440-28-0	Thallium	4.9			P
7440-62-2	Vanadium	36.1			P
7440-66-6	Zinc	181		NE	P
57-12-5	Cyanide	0.55	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSUS17(2.0)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 535456

Level (low/med): LOW Date Received: 07/22/03

% Solids: 95.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1940			P
7440-36-0	Antimony	5.7		N	P
7440-38-2	Arsenic	286			P
7440-39-3	Barium	74.0		*	P
7440-41-7	Beryllium	0.49		E	P
7440-43-9	Cadmium	0.57			P
7440-70-2	Calcium	7580		E*	P
7440-47-3	Chromium	14.3			P
7440-48-4	Cobalt	12.0			P
7440-50-8	Copper	90.5			P
7439-89-6	Iron	30100			P
7439-92-1	Lead	18.9		E*	P
7439-95-4	Magnesium	3380		E*	P
7439-96-5	Manganese	631			P
7439-97-6	Mercury	3.2		*	CV
7440-02-0	Nickel	32.9			P
7440-09-7	Potassium	1340		E	P
7782-49-2	Selenium	3.1		N	P
7440-22-4	Silver	1.8			P
7440-23-5	Sodium	20.4	U		P
7440-28-0	Thallium	2.3			P
7440-62-2	Vanadium	27.6			P
7440-66-6	Zinc	138		NE	P
57-12-5	Cyanide	0.52	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SHERTASUS25(1.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534806

Level (low/med): LOW Date Received: 07/18/03

% Solids: 93.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	17500			P
7440-36-0	Antimony	0.94	B	N	P
7440-38-2	Arsenic	26.0			P
7440-39-3	Barium	269		*	P
7440-41-7	Beryllium	0.55		E	P
7440-43-9	Cadmium	0.027	U		P
7440-70-2	Calcium	1930		E*	P
7440-47-3	Chromium	8.6			P
7440-48-4	Cobalt	10.5			P
7440-50-8	Copper	10.2			P
7439-89-6	Iron	20600			P
7439-92-1	Lead	10.4		E*	P
7439-95-4	Magnesium	6310		E*	P
7439-96-5	Manganese	444			P
7439-97-6	Mercury	0.048		*	CV
7440-02-0	Nickel	5.3			P
7440-09-7	Potassium	4900		E	P
7782-49-2	Selenium	0.24	B	N	P
7440-22-4	Silver	1.4			P
7440-23-5	Sodium	1330			P
7440-28-0	Thallium	0.26	U		P
7440-62-2	Vanadium	58.5			P
7440-66-6	Zinc	66.9		NE	P
57-12-5	Cyanide	0.52	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SHERWPSUS23(3.5)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Lab Sample ID: 534799

Level (low/med): LOW Date Received: 07/18/03

% Solids: 93.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	11900			P
7440-36-0	Antimony	6.0		N	P
7440-38-2	Arsenic	81.8			P
7440-39-3	Barium	188		*	P
7440-41-7	Beryllium	0.48		E	P
7440-43-9	Cadmium	0.63			P
7440-70-2	Calcium	2920		E*	P
7440-47-3	Chromium	6.7			P
7440-48-4	Cobalt	8.6			P
7440-50-8	Copper	30.5			P
7439-89-6	Iron	20100			P
7439-92-1	Lead	15.6		E*	P
7439-95-4	Magnesium	5200		E*	P
7439-96-5	Manganese	782			P
7439-97-6	Mercury	0.36		*	CV
7440-02-0	Nickel	5.2			P
7440-09-7	Potassium	3320		E	P
7782-49-2	Selenium	0.48		N	P
7440-22-4	Silver	32.5			P
7440-23-5	Sodium	676			P
7440-28-0	Thallium	0.76	B		P
7440-62-2	Vanadium	50.8			P
7440-66-6	Zinc	87.8		NE	P
57-12-5	Cyanide	0.53	U		AS

Color Before: brown Clarity Before: Texture: medium

Color After: yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Copper	500.0	515.80	103.2	200.0	195.90	98.0	202.10	101.0	P
Iron	25500.0	26240.00	102.9	30200.0	28580.00	94.6	29290.00	97.0	P
Lead	1000.0	987.60	98.8	400.0	372.60	93.2	392.60	98.2	P
Manganese	500.0	498.70	99.7	200.0	189.40	94.7	201.10	100.6	P
Mercury	3.0	3.06	102.0	5.0	5.05	101.0	4.68	93.6	CV
Nickel	500.0	501.60	100.3	200.0	189.30	94.6	196.90	98.4	P
Silver	500.0	501.50	100.3	100.0	98.50	98.5	101.70	101.7	P
Zinc	500.0	493.80	98.8	200.0	186.90	93.4	197.00	98.5	P
Cyanide	120.0	123.61	103.0	150.0	148.70	99.1	149.67	99.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Copper				200.0	207.90	104.0	206.00	103.0	P
Iron				30200.0	28620.00	94.8	27970.00	92.6	P
Lead				400.0	396.00	99.0	384.90	96.2	P
Manganese				200.0	202.40	101.2	198.70	99.4	P
Mercury				5.0	4.92	98.4	4.82	96.4	CV
Nickel				200.0	197.90	99.0	194.40	97.2	P
Silver				100.0	104.70	104.7	103.50	103.5	P
Zinc				200.0	194.90	97.4	188.30	94.2	P
Cyanide				150.0	151.64	101.1			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Copper				200.0	202.60	101.3			P
Iron				30200.0	27600.00	91.4			P
Lead				400.0	382.50	95.6			P
Manganese				200.0	195.50	97.8			P
Nickel				200.0	192.20	96.1			P
Silver				100.0	103.00	103.0			P
Zinc				200.0	187.10	93.6			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26250.00	101.0	30200.0	29990.00	99.3	31300.00	103.6	P
Antimony	250.0	256.50	102.6	300.0	310.00	103.3	322.80	107.6	P
Arsenic	250.0	258.30	103.3	100.0	101.40	101.4	109.50	109.5	P
Barium	500.0	513.70	102.7	200.0	204.20	102.1	212.50	106.2	P
Beryllium	500.0	521.60	104.3	100.0	101.70	101.7	105.80	105.8	P
Cadmium	500.0	511.50	102.3	100.0	100.40	100.4	104.60	104.6	P
Calcium	25000.0	25520.00	102.1	30200.0	29950.00	99.2	31230.00	103.4	P
Chromium	500.0	518.40	103.7	200.0	201.60	100.8	210.60	105.3	P
Cobalt	500.0	510.30	102.1	200.0	203.60	101.8	212.00	106.0	P
Magnesium	25000.0	25090.00	100.4	30200.0	29760.00	98.5	30920.00	102.4	P
Manganese	500.0	512.50	102.5	200.0	202.90	101.4	221.50	110.8	P
Mercury	3.0	2.82	94.0	5.0	4.90	98.0	4.71	94.2	CV
Potassium	25000.0	27060.00	108.2	30200.0	31700.00	105.0	32850.00	108.8	P
Selenium	250.0	253.00	101.2	100.0	102.80	102.8	107.60	107.6	P
Sodium	25000.0	24600.00	98.4	30200.0	29270.00	96.9	30520.00	101.1	P
Thallium	250.0	250.10	100.0	100.0	104.00	104.0	107.10	107.1	P
Vanadium	500.0	512.00	102.4	200.0	200.90	100.4	209.80	104.9	P
Cyanide	120.0	122.17	101.8	150.0	148.25	98.8	153.71	102.5	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum				30200.0	30200.00	100.0	29990.00	99.3	P
Antimony				300.0	308.30	102.8	311.20	103.7	P
Arsenic				100.0	105.20	105.2	102.50	102.5	P
Barium				200.0	205.20	102.6	203.90	102.0	P
Beryllium				100.0	103.00	103.0	102.50	102.5	P
Cadmium				100.0	101.20	101.2	100.60	100.6	P
Calcium				30200.0	30250.00	100.2	30070.00	99.6	P
Chromium				200.0	203.40	101.7	202.30	101.2	P
Cobalt				200.0	205.10	102.6	203.70	101.8	P
Magnesium				30200.0	29890.00	99.0	29710.00	98.4	P
Manganese				200.0	210.50	105.2	207.80	103.9	P
Mercury				5.0	4.61	92.2	5.15	103.0	CV
Potassium				30200.0	31740.00	105.1	31560.00	104.5	P
Selenium				100.0	101.60	101.6	102.50	102.5	P
Sodium				30200.0	29440.00	97.5	29340.00	97.2	P
Thallium				100.0	104.50	104.5	105.60	105.6	P
Vanadium				200.0	201.20	100.6	200.00	100.0	P
Cyanide				150.0	153.34	102.2			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum				30200.0	30090.00	99.6	30420.00	100.7	P
Antimony				300.0	310.10	103.4	313.40	104.5	P
Arsenic				100.0	102.20	102.2	104.20	104.2	P
Barium				200.0	205.70	102.8	207.10	103.6	P
Beryllium				100.0	102.10	102.1	103.40	103.4	P
Cadmium				100.0	100.30	100.3	101.90	101.9	P
Calcium				30200.0	29960.00	99.2	30520.00	101.1	P
Chromium				200.0	202.00	101.0	204.70	102.4	P
Cobalt				200.0	203.90	102.0	206.00	103.0	P
Magnesium				30200.0	29660.00	98.2	30180.00	99.9	P
Manganese				200.0	208.30	104.2	210.30	105.2	P
Mercury				5.0	4.78	95.6	4.68	93.6	CV
Potassium				30200.0	31880.00	105.6	32050.00	106.1	P
Selenium				100.0	104.00	104.0	104.90	104.9	P
Sodium				30200.0	29360.00	97.2	29660.00	98.2	P
Thallium				100.0	102.10	102.1	103.60	103.6	P
Vanadium				200.0	201.80	100.9	204.20	102.1	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Manganese	500.0	510.80	102.2	200.0	203.00	101.5	201.00	100.5	P
Mercury	3.0	2.76	92.0	5.0	5.06	101.2	4.90	98.0	CV
Selenium	250.0	241.20	96.5	100.0	97.03	97.0	96.37	96.4	P
Cyanide	120.0	122.31	101.9	150.0	147.29	98.2	149.35	99.6	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Manganese				200.0	202.90	101.4			P
Mercury				5.0	5.00	100.0			CV
Selenium				100.0	97.98	98.0			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Cyanide	120.0	113.10	94.2	150.0	145.09	96.7	144.62	96.4	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Copper				50.0	47.49	95.0	47.16	94.3
Iron				200.0	250.60	125.3	231.40	115.7
Lead				6.0	3.39	56.5	3.46	57.7
Manganese				30.0	28.56	95.2	28.88	96.3
Mercury	0.2	0.17	85.0					
Nickel				80.0	77.53	96.9	77.01	96.3
Silver				20.0	18.57	92.8	19.87	99.4
Zinc				40.0	38.17	95.4	37.75	94.4

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	616.80	154.2	773.60	193.4
Antimony				120.0	126.30	105.2	128.10	106.8
Arsenic				20.0	18.81	94.0	20.18	100.9
Barium				400.0	409.70	102.4	406.90	101.7
Beryllium				10.0	10.67	106.7	11.06	110.6
Cadmium				10.0	10.62	106.2	10.89	108.9
Calcium				10000.0	10620.00	106.2	10990.00	109.9
Chromium				20.0	21.67	108.4	22.90	114.5
Cobalt				100.0	99.81	99.8	102.10	102.1
Magnesium				10000.0	10320.00	103.2	10580.00	105.8
Manganese				30.0	30.76	102.5	31.74	105.8
Mercury	0.2	0.22	110.0					
Potassium				10000.0	12070.00	120.7	11930.00	119.3
Selenium				10.0	10.57	105.7	10.81	108.1
Sodium				10000.0	9755.00	97.6	9930.00	99.3
Thallium				20.0	22.26	111.3	24.82	124.1
Vanadium				100.0	101.70	101.7	103.10	103.1

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Manganese				30.0	33.23	110.8	33.37	111.2
Mercury	0.2	0.26	130.0					
Selenium				10.0	7.49	74.9	8.28	82.8

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									1.839	B	P
Antimony									0.934	B	P
Arsenic									0.240	U	P
Barium									0.730	U	P
Beryllium									-0.057	B	P
Cadmium									0.030	U	P
Calcium									22.320	U	P
Chromium									0.101	B	P
Cobalt									0.180	U	P
Copper	1.4	U	-1.5	B	-2.0	B	-2.0	B	0.140	U	P
Iron	16.8	U	-31.7	B	16.8	U	18.3	B	-3.435	B	P
Lead	1.5	U	1.5	U	1.5	U	1.5	U	0.150	U	P
Magnesium									18.170	U	P
Manganese	0.7	U	0.7	U	1.0	B	0.7	U	0.070	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV
Nickel	2.0	U	2.0	U	2.0	U	2.0	U	-0.338	B	P
Potassium									25.000	U	P
Selenium									0.170	U	P
Silver	0.9	U	-1.2	B	0.9	U	0.9	U	-0.175	B	P
Sodium									31.190	B	P
Thallium									-0.701	B	P
Vanadium									0.220	U	P
Zinc	5.7	U	5.7	U	5.7	U	5.7	U	0.570	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									1.830	U	P
Antimony									0.762	B	P
Arsenic									0.393	B	P
Barium									0.730	U	P
Beryllium									0.020	U	P
Cadmium									0.030	U	P
Calcium									22.320	U	P
Chromium									0.129	B	P
Cobalt									0.180	U	P
Copper			-2.8	B	-1.8	B			0.140	U	P
Iron			16.8	U	22.2	B			4.716	B	P
Lead			1.5	U	1.5	U			0.204	B	P
Magnesium									18.170	U	P
Manganese			0.7	U	0.7	U			0.145	B	P
Mercury			0.1	U							CV
Nickel			2.0	U	2.0	U			-0.383	B	P
Potassium									25.000	U	P
Selenium									0.300	B	P
Silver			0.9	U	0.9	U			0.090	U	P
Sodium									27.910	B	P
Thallium									-0.899	B	P
Vanadium									0.220	U	P
Zinc			5.7	U	5.7	U			1.093	B	P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.463	U	AS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	18.3	U	19.3	B	18.3	U	18.3	U			P
Antimony	3.8	U	3.8	U	3.8	U	3.8	U			P
Arsenic	2.4	U	2.4	U	2.4	U	2.4	U			P
Barium	7.3	U	7.3	U	7.3	U	7.3	U			P
Beryllium	0.6	B	0.2	U	0.5	B	0.5	B			P
Cadmium	0.3	U	0.3	U	0.3	U	0.3	U			P
Calcium	223.2	U	223.2	U	223.2	U	223.2	U			P
Chromium	0.6	U	0.6	U	0.6	U	0.6	U			P
Cobalt	1.8	U	1.8	U	1.8	U	1.8	U			P
Magnesium	181.7	U	181.7	U	181.7	U	181.7	U			P
Manganese	0.7	U	0.7	U	2.0	B	1.1	B			P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV
Potassium	250.0	U	250.0	U	250.0	U	250.0	U			P
Selenium	1.7	U	1.7	U	1.7	U	2.1	B			P
Sodium	218.8	U	218.8	U	218.8	U	218.8	U			P
Thallium	5.7	B	2.8	U	2.8	U	2.9	B			P
Vanadium	2.2	U	2.2	U	2.2	U	2.2	U			P

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			18.3	U	23.5	B	29.3	B			P
Antimony			3.8	U	3.8	U	3.8	U			P
Arsenic			2.4	U	2.4	U	2.4	U			P
Barium			7.3	U	7.3	U	7.3	U			P
Beryllium			0.9	B	0.5	B	0.3	B			P
Cadmium			0.3	U	0.3	U	0.3	U			P
Calcium			223.2	U	223.2	U	223.2	U			P
Chromium			0.6	U	0.6	U	0.6	U			P
Cobalt			1.8	U	1.8	U	1.8	U			P
Magnesium			181.7	U	181.7	U	181.7	U			P
Manganese			0.9	B	1.3	B	0.8	B			P
Mercury			0.1	B	0.1	U	0.1	U			CV
Potassium			250.0	U	250.0	U	250.0	U			P
Selenium			1.7	U	2.3	B	1.7	U			P
Sodium			218.8	U	218.8	U	218.8	U			P
Thallium			2.9	B	2.8	U	2.8	U			P
Vanadium			2.2	U	2.2	U	2.2	U			P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Mercury	0.1	B	0.1	U	0.1	U	0.1	U			CV
Selenium	3.4	U	3.4	U	-3.5	B	3.4	U			P
Cyanide	10.0	U	10.0	U	10.0	U					AS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U			0.476	U	AS

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Copper	0	473	1	510.2	107.9	0	519.0	109.7
Iron	200000	172540	196300	190400.0	110.4	186200	180100.0	104.4
Lead	0	44	5	46.3	105.2	5	50.2	114.1
Manganese	0	428	0	457.1	106.8	0	461.5	107.8
Nickel	0	877	11	930.0	106.0	10	928.9	105.9
Silver	0	196	-1	208.1	106.2	0	213.9	109.1
Zinc	0	841	5	912.6	108.5	3	898.1	106.8

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	452460	479600	477000.0	105.4	480800	477100.0	105.4
Antimony	0	572	8	661.3	115.6	3	656.5	114.8
Arsenic	0	94	1	110.0	117.0	3	106.1	112.9
Barium	0	466	2	525.7	112.8	2	525.3	112.7
Beryllium	0	446	-1	504.6	113.1	-1	503.5	112.9
Cadmium	0	874	8	999.8	114.4	8	992.7	113.6
Calcium	500000	421280	468900	472900.0	112.3	475200	472400.0	112.1
Chromium	0	436	4	500.1	114.7	5	498.1	114.2
Cobalt	0	435	8	493.7	113.5	8	493.2	113.4
Magnesium	500000	498160	542200	548300.0	110.1	545600	545600.0	109.5
Manganese	0	428	1	493.5	115.3	1	497.0	116.1
Potassium	0	0	191	257.4		212	183.7	
Selenium	0	48	-2	49.6	103.3	-3	50.2	104.6
Sodium	0	0	-52	-371.8		-173	-421.6	
Thallium	0	95	4	100.2	105.5	1	104.2	109.7
Vanadium	0	417	-2	477.2	114.4	-2	477.4	114.5

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Manganese	0	474	2	486.6	102.7	2	480.8	101.4
Selenium	0	47	3	48.3	102.8	0	52.4	111.5

USEPA-CLP FORMS

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

MAGNWPSUS14(3.0)S

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 88.4

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum		9563.9648		7290.9072		186.98	1215.7		P
Antimony	75 - 125	20.9323		10.5733		46.74	22.2	N	P
Arsenic		1549.1190		1215.1510		3.74	8929.6		P
Barium	75 - 125	337.6837		130.5466		186.98	110.8		P
Beryllium	75 - 125	5.6468		1.1996		4.67	95.2		P
Cadmium	75 - 125	3.9191		0.0274	U	4.67	83.9		P
Chromium	75 - 125	30.4308		10.7648		18.70	105.2		P
Cobalt	75 - 125	64.4329		18.0174		46.74	99.3		P
Copper	75 - 125	85.1408		61.1590		23.37	102.6		P
Iron		63161.4414		75728.0000		93.49	-13441.		P
Lead		23.0077		31.7107		1.87	-465.4		P
Manganese		2541.0420		2350.0220		46.74	408.7		P
Mercury		3.0225		1.7776		0.18	691.6		CV
Nickel	75 - 125	56.3180		17.0687		46.74	84.0		P
Selenium	75 - 125	2.9786		2.4048		0.93	61.7	N	P
Silver	75 - 125	8.0345		4.0012		4.67	86.4		P
Thallium	75 - 125	9.2732		4.8871		4.67	93.9		P
Vanadium	75 - 125	85.9448		36.0805		46.74	106.7		P
Zinc	75 - 125	191.9337		181.2692		46.74	22.8	N	P
Cyanide	75 - 125	4.2192		0.5491	U	5.14	82.1		AS

Comments:

USEPA-CLP FORMS

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

MAGNWPSUS14(3.0)A

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS _____ SDG No.: GCS002

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		81820.00		79920.00		2000.0	95.0		P
Antimony		640.50		115.90		500.0	104.9		P
Arsenic		13650.00		13320.00		40.0	825.0		P
Barium		3508.00		1431.00		2000.0	103.8		P
Beryllium		65.81		13.15		50.0	105.3		P
Cadmium		43.30		0.30	U	50.0	86.6		P
Chromium		328.40		118.00		200.0	105.2		P
Cobalt		702.10		197.50		500.0	100.9		P
Copper		963.60		670.40		250.0	117.3		P
Iron		794500.00		830100.00		1000.0	-3560.		P
Lead		360.70		347.60		20.0	65.5		P
Manganese		31350.00		25760.00		500.0	1118.0		P
Nickel		708.90		187.10		500.0	104.4		P
Selenium		36.52		26.36		10.0	101.6		P
Silver		102.00		43.86		50.0	116.3		P
Thallium		102.00		53.57		50.0	96.9		P
Vanadium		925.10		395.50		500.0	105.9		P
Zinc		2410.00		1987.00		500.0	84.6		P
Cyanide		20.98		10.00	U	20.0	104.9		AS

Comments: _____

6

DUPLICATES

SAMPLE NO.

MAGNWPSUS14(3.0)D

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Level (low/med): LOW

% Solids for Sample: 88.4 % Solids for Duplicate: 89.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		7290.9072		7918.5508		8.3		P
Antimony	5.5	10.5733		9.5965		9.7		P
Arsenic		1215.1510		1072.7750		12.4		P
Barium		130.5466		273.2843		70.7	*	P
Beryllium	0.5	1.1996		1.0690		11.5		P
Cadmium		0.0274	U	0.0283	U			P
Calcium		11886.9502		14903.8496		22.5	*	P
Chromium		10.7648		12.9431		18.4		P
Cobalt	4.6	18.0174		18.8726		4.6		P
Copper		61.1590		59.6248		2.5		P
Iron		75728.0000		75933.2500		0.3		P
Lead		31.7107		25.6599		21.1	*	P
Magnesium		3400.0510		4880.2788		35.8	*	P
Manganese		2350.0220		2535.8220		7.6		P
Mercury		1.7776		3.1848		56.7	*	CV
Nickel	3.6	17.0687		16.7515		1.9		P
Potassium		2745.0371		2911.0100		5.9		P
Selenium	0.5	2.4048		1.9862		19.1		P
Silver	0.9	4.0012		3.8490		3.9		P
Sodium		168.1324	B	172.3228	B	2.5		P
Thallium		4.8871		5.4223		10.4		P
Vanadium		36.0805		39.9321		10.1		P
Zinc		181.2692		151.9608		17.6		P
Cyanide		0.5491	U	0.5096	U			AS

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	211.1		160.0	240.0	105.6
Antimony				50.0	52.8		40.0	60.0	105.6
Arsenic				24.0	24.3		19.2	28.8	101.2
Barium				200.0	205.8		160.0	240.0	102.9
Beryllium				5.0	5.2		4.0	6.0	104.0
Cadmium				25.0	25.9		20.0	30.0	103.6
Calcium				2000.0	2057.0		1600.0	2400.0	102.8
Chromium				20.0	21.3		16.0	24.0	106.5
Cobalt				50.0	50.9		40.0	60.0	101.8
Copper				25.0	25.6		20.0	30.0	102.4
Iron				100.0	99.8		80.0	120.0	99.8
Lead				22.0	21.0		17.6	26.4	95.5
Magnesium				2000.0	1951.0		1600.0	2400.0	97.6
Manganese				50.0	49.1		40.0	60.0	98.2
Mercury				0.1	0.1		0.1	0.1	100.0
Nickel				50.0	48.2		40.0	60.0	96.4
Potassium				2000.0	2138.0		1600.0	2400.0	106.9
Selenium				21.0	20.4		16.8	25.2	97.1
Silver				25.0	24.7		20.0	30.0	98.8
Sodium				2000.0	1979.0		1600.0	2400.0	99.0
Thallium				25.0	24.5		20.0	30.0	98.0
Vanadium				50.0	52.6		40.0	60.0	105.2
Zinc				50.0	48.8		40.0	60.0	97.6
Cyanide				6.0	6.0		5.4	6.6	100.0

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	216.3		160.0	240.0	108.2
Antimony				50.0	53.2		40.0	60.0	106.4
Arsenic				24.0	24.8		19.2	28.8	103.3
Barium				200.0	209.0		160.0	240.0	104.5
Beryllium				5.0	5.3		4.0	6.0	106.0
Cadmium				25.0	26.0		20.0	30.0	104.0
Calcium				2000.0	2079.0		1600.0	2400.0	104.0
Chromium				20.0	21.4		16.0	24.0	107.0
Cobalt				50.0	51.2		40.0	60.0	102.4
Copper				25.0	26.9		20.0	30.0	107.6
Iron				100.0	97.5		80.0	120.0	97.5
Lead				22.0	21.7		17.6	26.4	98.6
Magnesium				2000.0	1970.0		1600.0	2400.0	98.5
Manganese				50.0	50.8		40.0	60.0	101.6
Nickel				50.0	48.8		40.0	60.0	97.6
Potassium				2000.0	2158.0		1600.0	2400.0	107.9
Selenium				21.0	20.7		16.8	25.2	98.6
Silver				25.0	25.7		20.0	30.0	102.8
Sodium				2000.0	1993.0		1600.0	2400.0	99.6
Thallium				25.0	24.2		20.0	30.0	96.8
Vanadium				50.0	53.2		40.0	60.0	106.4
Zinc				50.0	48.6		40.0	60.0	97.2

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Mercury				0.1	0.1		0.1 0.1	100.0
Cyanide				6.0	6.1		5.4 6.6	101.7

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Cyanide				6.0	5.7		5.4	6.6	95.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Solid LCS Source: Environmental Express

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	5.8		5.4 6.6	96.7

9
ICP SERIAL DILUTIONS

SAMPLE NO.

MAGNWPSUS14(3.0)L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	79920.00		87830.00		9.9		P
Antimony	115.90		134.10	B	15.7		P
Arsenic	13320.00		14270.00		7.1		P
Barium	1431.00		1504.00		5.1		P
Beryllium	13.15		15.46	B	17.6	E	P
Cadmium	0.30	U	1.50	U			P
Calcium	130300.00		146400.00		12.4	E	P
Chromium	118.00		129.40		9.7		P
Cobalt	197.50		216.80	B	9.8		P
Copper	670.40		697.40		4.0		P
Iron	830100.00		898400.00		8.2		P
Lead	347.60		396.20		14.0	E	P
Magnesium	37270.00		41930.00		12.5	E	P
Manganese	25760.00		27710.00		7.6		P
Nickel	187.10		204.90		9.5		P
Potassium	30090.00		36090.00		19.9	E	P
Selenium	26.36		30.21		14.6		P
Silver	43.86		42.99	B	2.0		P
Sodium	1843.00	B	1410.00	B	23.5		P
Thallium	53.57		74.70		39.4		P
Vanadium	395.50		422.00		6.7		P
Zinc	1987.00		2248.00		13.1	E	P

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: Date: 07/01/03

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: Date: 07/01/03

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Manganese	257.610		15	0.7	P
Selenium	196.026		5	3.4	P

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	18.3	P
Antimony	206.838		60	3.8	P
Arsenic	189.042		10	2.4	P
Barium	493.409		200	7.3	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.3	P
Calcium	317.933		5000	223.2	P
Chromium	267.716		10	0.6	P
Cobalt	228.616		50	1.8	P
Magnesium	279.079		5000	181.7	P
Manganese	257.610		15	0.7	P
Potassium	766.491		5000	250.0	P
Selenium	196.026		5	1.7	P
Sodium	330.232		5000	218.8	P
Thallium	190.864		10	2.8	P
Vanadium	292.402		50	2.2	P

Comments: _____

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Copper	324.754		25	1.4	P
Iron	271.441		100	16.8	P
Lead	220.353		3	1.5	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.0	P
Silver	328.068		10	0.9	P
Zinc	206.200		20	5.7	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Manganese	10.00	10000.0	P
Selenium	10.00	5000.0	P

Comments: _____

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Magnesium	10.00	600000.0	P
Manganese	10.00	10000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P

Comments:

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Copper	10.00	100000.0	P
Iron	10.00	1000000.0	P
Lead	10.00	50000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	50000.0	P
Silver	10.00	2000.0	P
Zinc	10.00	10000.0	P

Comments:

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CAPMTASUS22(1.5)	07/24/03	1.04	50.0
CAPMWPSUS20(4.0)	07/24/03	1.02	50.0
CAPMWPSUS21(2.5)	07/24/03	1.00	50.0
CAPMWPSUS39(2.0)	07/24/03	1.01	50.0
GRANBGSSS34(0.5)	07/24/03	1.02	50.0
GRANBGSSS35(0.5)	07/24/03	1.00	50.0
GRANBGSSS36(0.5)	07/24/03	1.00	50.0
ICV	07/24/03	50.0	50.0
LCSS0724B	07/24/03	1.00	50.0
PBS0724B	07/24/03	1.00	50.0
SHERTASUS25(1.5)	07/24/03	1.03	50.0
SHERWPSUS23(3.5)	07/24/03	1.01	50.0

USEPA-CLP FORMS

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXWPSUS08(1.2)	07/29/03	1.33	50.0
AJAXWPSUS09(1.0)	07/29/03	1.06	50.0
AJAXWPSUS10(2.0)	07/29/03	1.04	50.0
ICV	07/29/03	50.0	50.0
LCSS0729C	07/29/03	1.00	50.0
LUCABGSSS19(0.5)	07/29/03	1.01	50.0
MAGNTASSS15(0.5)	07/29/03	1.00	50.0
MAGNTASSS15(0.5)(100	07/29/03	1.13	50.0
MAGNTASUS18(1.5)	07/29/03	1.11	50.0
MAGNWPSSS16(0.5)	07/29/03	1.03	50.0
MAGNWPSUS14(3.0)	07/29/03	1.03	50.0
MAGNWPSUS14(3.0)D	07/29/03	1.11	50.0
MAGNWPSUS14(3.0)S	07/29/03	1.10	50.0
MAGNWPSUS17(2.0)	07/29/03	1.01	50.0
PBS0729C	07/29/03	1.08	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
ICV	07/31/03	50.0	50.0
LCSDS0731B	07/31/03	1.00	50.0
LCSS0731B	07/31/03	1.00	50.0
MAGNPDSSS12(0.3)	07/31/03	1.07	50.0
PBS0731B	07/31/03	1.05	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: CV

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CAPMTASUS22(1.5)	07/31/03	0.66	100.0
CAPMWPSUS20(4.0)	07/31/03	0.64	100.0
CAPMWPSUS21(2.5)	07/31/03	0.66	100.0
CAPMWPSUS39(2.0)	07/31/03	0.63	100.0
GRANBGSSS34(0.5)	07/31/03	0.63	100.0
GRANBGSSS35(0.5)	07/31/03	0.67	100.0
GRANBGSSS36(0.5)	07/31/03	0.60	100.0
LCSS0731A	07/31/03	1.00	100.0
PBS0731A	07/31/03	0.60	100.0
SHERTASUS25(1.5)	07/31/03	0.66	100.0
SHERWPSUS23(3.5)	07/31/03	0.67	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: CV

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXWPSUS08(1.2)	08/08/03	0.65	100.0
AJAXWPSUS09(1.0)	08/08/03	0.62	100.0
AJAXWPSUS10(2.0)	08/08/03	0.68	100.0
LCSS0808C	08/08/03	1.00	100.0
LUCABGSSS19(0.5)	08/08/03	0.64	100.0
MAGNPDSSS12(0.3)	08/08/03	0.63	100.0
MAGNTASSS15(0.5)	08/08/03	0.64	100.0
MAGNTASSS15(0.5)(100	08/08/03	0.61	100.0
MAGNTASUS18(1.5)	08/08/03	0.65	100.0
MAGNWPSSS16(0.5)	08/08/03	0.66	100.0
MAGNWPSUS14(3.0)	08/08/03	0.63	100.0
MAGNWPSUS14(3.0)D	08/08/03	0.65	100.0
MAGNWPSUS14(3.0)S	08/08/03	0.64	100.0
MAGNWPSUS17(2.0)	08/08/03	0.65	100.0
PBS0808C	08/08/03	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CAPMTASUS22(1.5)	08/07/03	1.14	100.0
CAPMWPSUS20(4.0)	08/07/03	1.21	100.0
CAPMWPSUS21(2.5)	08/07/03	1.20	100.0
CAPMWPSUS39(2.0)	08/07/03	1.32	100.0
GRANBGSSS34(0.5)	08/07/03	1.27	100.0
GRANBGSSS35(0.5)	08/07/03	1.30	100.0
GRANBGSSS36(0.5)	08/07/03	1.27	100.0
LCSS0807I	08/07/03	1.00	100.0
PBS0807I	08/07/03	1.00	100.0
SHERTASUS25(1.5)	08/07/03	1.18	100.0
SHERWPSUS23(3.5)	08/07/03	1.35	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Method: P

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXWPSUS08(1.2)	08/17/03	1.13	100.0
AJAXWPSUS09(1.0)	08/17/03	1.28	100.0
AJAXWPSUS10(2.0)	08/17/03	1.28	100.0
LCSS0817A	08/17/03	1.00	100.0
LUCABGSSS19(0.5)	08/17/03	1.25	100.0
MAGNPDSSS12(0.3)	08/17/03	1.29	100.0
MAGNTASSS15(0.5)	08/17/03	1.18	100.0
MAGNTASSS15(0.5)(100	08/17/03	1.36	100.0
MAGNTASUS18(1.5)	08/17/03	1.32	100.0
MAGNWPSSS16(0.5)	08/17/03	1.17	100.0
MAGNWPSUS14(3.0)	08/17/03	1.24	100.0
MAGNWPSUS14(3.0)D	08/17/03	1.20	100.0
MAGNWPSUS14(3.0)S	08/17/03	1.21	100.0
MAGNWPSUS17(2.0)	08/17/03	1.13	100.0
PBS0817A	08/17/03	1.00	100.0

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/25/03 End Date: 07/25/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1050																								X
S10	1.00	1051																								X
S30	1.00	1052																								X
S50	1.00	1053																								X
S100	1.00	1054																								X
S200	1.00	1054																								X
S300	1.00	1055																								X
ICV	1.00	1057																								X
ICB	1.00	1058																								X
LRS	1.00	1059																								X
LRS	1.00	1100																								X
CCV	1.00	1101																								X
CCB	1.00	1102																								X
ZZZZZZ	1.00	1103																								
LCSS0724B	1.00	1104																								X
PBS0724B	1.00	1105																								X
SHERWPSUS23(3.5)	1.00	1106																								X
CAPMWPSUS20(4.0)	1.00	1107																								X
CAPMWPSUS21(2.5)	1.00	1108																								X
CAPMTASUS22(1.5)	1.00	1109																								X
SHERTASUS25(1.5)	1.00	1110																								X
CAPMWPSUS39(2.0)	1.00	1111																								X
GRANBGSSS34(0.5)	1.00	1112																								X
CCV	1.00	1113																								X
CCB	1.00	1114																								X
GRANBGSSS35(0.5)	1.00	1115																								X
GRANBGSSS36(0.5)	1.00	1116																								X
ZZZZZZ	1.00	1117																								
ZZZZZZ	1.00	1118																								
ZZZZZZ	1.00	1119																								
ZZZZZZ	1.00	1120																								
ZZZZZZ	1.00	1121																								
ZZZZZZ	1.00	1122																								
ZZZZZZ	1.00	1123																								
ZZZZZZ	1.00	1123																								
CCV	1.00	1124																								X
CCB	1.00	1125																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/29/03 End Date: 07/29/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2152																								X
S10	1.00	2153																								X
S30	1.00	2154																								X
S50	1.00	2155																								X
S100	1.00	2156																								X
S200	1.00	2157																								X
S300	1.00	2157																								X
ICV	1.00	2159																								X
ICB	1.00	2200																								X
LRS	1.00	2201																								X
LRS	1.00	2202																								X
CCV	1.00	2203																								X
CCB	1.00	2204																								X
PBS0729C	1.00	2205																								X
LCSS0729C	1.00	2206																								X
ZZZZZZ	1.00	2207																								
ZZZZZZ	1.00	2208																								
ZZZZZZ	1.00	2209																								
ZZZZZZ	1.00	2210																								
ZZZZZZ	1.00	2211																								
ZZZZZZ	1.00	2212																								
ZZZZZZ	1.00	2213																								
ZZZZZZ	1.00	2214																								
CCV	1.00	2215																								X
CCB	1.00	2216																								X
AJAXWPSUS08(1.2)	1.00	2217																								X
AJAXWPSUS09(1.0)	1.00	2218																								X
MAGNTASSS15(0.5)	1.00	2219																								X
MAGNTASSS15(0.5)(100	1.00	2220																								X
LUCABGSSS19(0.5)	1.00	2221																								X
MAGNTASUS18(1.5)	1.00	2222																								X
MAGNWPSSS16(0.5)	1.00	2223																								X
AJAXWPSUS10(2.0)	1.00	2224																								X
MAGNWPSUS14(3.0)	1.00	2225																								X
MAGNWPSUS14(3.0)D	1.00	2226																								X
CCV	1.00	2226																								X
CCB	1.00	2227																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/29/03 End Date: 07/29/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2243																								X
S10	1.00	2244																								X
S30	1.00	2245																								X
S50	1.00	2246																								X
S100	1.00	2247																								X
S200	1.00	2248																								X
S300	1.00	2249																								X
ICV	1.00	2251																								X
ICB	1.00	2252																								X
LRS	1.00	2253																								X
LRS	1.00	2254																								X
CCV	1.00	2254																								X
CCB	1.00	2255																								X
MAGNWPSUS14(3.0)S	1.00	2256																								X
MAGNWPSUS17(2.0)	1.00	2257																								X
MAGNWPSUS14(3.0)A	1.00	2258																								X
CCV	1.00	2259																								X
CCB	1.00	2300																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/31/03 End Date: 07/31/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1336																								X
S10	1.00	1337																								X
S30	1.00	1338																								X
S50	1.00	1339																								X
S100	1.00	1340																								X
S200	1.00	1341																								X
S300	1.00	1342																								X
ICV	1.00	1343																								X
ICB	1.00	1344																								X
LRS	1.00	1345																								X
LRS	1.00	1346																								X
CCV	1.00	1347																								X
CCB	1.00	1348																								X
ZZZZZZ	1.00	1349																								
PBS0731B	1.00	1350																								X
LCSS0731B	1.00	1351																								X
MAGNPDSSS12(0.3)	1.00	1352																								X
LCSDS0731B	1.00	1353																								X
ZZZZZZ	1.00	1354																								
ZZZZZZ	1.00	1355																								
ZZZZZZ	1.00	1356																								
ZZZZZZ	1.00	1357																								
ZZZZZZ	1.00	1358																								
CCV	1.00	1359																								X
CCB	1.00	1400																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	1334											X	X	X		X		X			X				X				
S	1.00	1338												X																
S	1.00	1342													X															
S	1.00	1346											X				X		X			X				X				
LRS	1.00	1350											X	X	X		X		X			X				X				
LRS	1.00	1354											X	X	X		X		X			X				X				
LRS	1.00	1358											X	X	X		X		X			X				X				
ICV	1.00	1403											X	X	X		X		X			X				X				
ICB	1.00	1407											X	X	X		X		X			X				X				
ICSA	1.00	1411											X	X	X		X		X			X				X				
ICSAB	1.00	1415											X	X	X		X		X			X				X				
CRI	1.00	1419											X	X	X		X		X			X				X				
CCV	1.00	1423											X	X	X		X		X			X				X				
CCB	1.00	1427											X	X	X		X		X			X				X				
PBS0817A	1.00	1432											X	X	X		X		X			X				X				
LCSS0817A	1.00	1436											X	X	X		X		X			X				X				
AJAXWPSUS08(1.2)	1.00	1440											X	X	X				X			X				X				
AJAXWPSUS09(1.0)	1.00	1444											X	X	X				X			X				X				
MAGNTASSS15(0.5)	1.00	1448											X	X	X		X		X			X				X				
MAGNTASSS15(0.5)(100	1.00	1452											X	X	X		X		X			X				X				
LUCABGSSS19(0.5)	1.00	1456											X	X	X		X		X			X				X				
MAGNTASUS18(1.5)	1.00	1500											X	X	X		X		X			X				X				
MAGNPDSSS12(0.3)	1.00	1504											X	X	X				X			X				X				
MAGNWPSSS16(0.5)	1.00	1508											X	X	X		X		X			X				X				
CCV	1.00	1512											X	X	X		X		X			X				X				
CCB	1.00	1516											X	X	X		X		X			X				X				
AJAXWPSUS10(2.0)	1.00	1520											X	X	X		X		X			X				X				
MAGNWPSUS14(3.0)	1.00	1524											X	X	X				X			X				X				
MAGNWPSUS14(3.0)L	5.00	1529											X	X	X				X			X				X				
MAGNWPSUS14(3.0)A	1.00	1533											X	X	X				X			X				X				
MAGNWPSUS14(3.0)D	1.00	1537											X	X	X				X			X				X				
MAGNWPSUS14(3.0)S	1.00	1541											X	X	X				X			X				X				
MAGNWPSUS17(2.0)	1.00	1545											X	X	X		X		X			X				X				
PBS0807I	1.00	1549											X	X	X		X		X			X				X				
LCSS0807I	1.00	1553											X	X	X		X		X			X				X				
SHERWPSUS23(3.5)	1.00	1557											X	X	X		X		X			X				X				
CCV	1.00	1601											X	X	X		X		X			X				X				
CCB	1.00	1605											X	X	X		X		X			X				X				

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CAPMWPSUS20(4.0)	1.00	1609											X	X	X		X		X			X				X	
CAPMWPSUS21(2.5)	1.00	1613											X	X	X		X		X			X				X	
CAPMTASUS22(1.5)	1.00	1617											X	X	X		X		X			X				X	
CAPMWPSUS39(2.0)	1.00	1621											X	X	X		X		X			X				X	
GRANBGSSS34(0.5)	1.00	1625											X	X	X		X		X			X				X	
GRANBGSSS35(0.5)	1.00	1630											X	X	X		X		X			X				X	
GRANBGSSS36(0.5)	1.00	1634											X	X	X		X		X			X				X	
SHERTASUS25(1.5)	1.00	1638											X	X	X		X		X			X				X	
CCV	1.00	1642											X	X	X		X		X			X				X	
CCB	1.00	1646											X	X	X		X		X			X				X	
ICSA	1.00	1650											X	X	X		X		X			X				X	
ICSAB	1.00	1654											X	X	X		X		X			X				X	
CRI	1.00	1658											X	X	X		X		X			X				X	
CCV	1.00	1702											X	X	X		X		X			X				X	
CCB	1.00	1707											X	X	X		X		X			X				X	

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/27/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2147		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
S	1.00	2151		X						X						X				X			X				
S	1.00	2154			X	X															X			X			
S	1.00	2158					X	X	X		X	X					X								X		
LRS	1.00	2203		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
LRS	1.00	2207		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
LRS	1.00	2211		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICV	1.00	2215		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICB	1.00	2219		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICSA	1.00	2223		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICSAB	1.00	2228		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CRI	1.00	2232		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCV	1.00	2236		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	2240		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
PBS0817A	1.00	2244		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
LCSS0817A	1.00	2248		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
AJAXWPSUS08(1.2)	1.00	2252		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
AJAXWPSUS09(1.0)	1.00	2256		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
MAGNTASSS15(0.5)	1.00	2300		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
MAGNTASSS15(0.5)(100	1.00	2304		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
LUCABGSSS19(0.5)	1.00	2308		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
MAGNTASUS18(1.5)	1.00	2312		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
MAGNPDSSS12(0.3)	1.00	2317		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
MAGNWPSSS16(0.5)	1.00	2321		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
CCV	1.00	2325		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	2329		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
AJAXWPSUS10(2.0)	1.00	2333		X	X	X	X	X	X	X	X	X				X				X			X	X	X		
MAGNWPSUS14(3.0)	1.00	2337		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
MAGNWPSUS14(3.0)L	5.00	2341		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
MAGNWPSUS14(3.0)A	1.00	2345		X	X		X	X	X		X	X									X			X	X		
MAGNWPSUS14(3.0)D	1.00	2349		X	X		X	X	X	X	X	X				X				X	X		X	X	X		
MAGNWPSUS14(3.0)S	1.00	2353		X	X		X	X	X		X	X									X			X	X		
MAGNWPSUS17(2.0)	1.00	2357		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
PBS0807I	1.00	0001		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
LCSS0807I	1.00	0005		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
SHERWPSUS23(3.5)	1.00	0009		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
CCV	1.00	0013		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	0018		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/27/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
CAPMWPSUS20(4.0)	1.00	0022		X	X	X	X	X	X	X	X	X				X				X			X	X	X		
CAPMWPSUS21(2.5)	1.00	0026		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
CAPMTASUS22(1.5)	1.00	0030		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
CAPMWPSUS39(2.0)	1.00	0034		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
GRANBGSSS34(0.5)	1.00	0038		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
GRANBGSSS35(0.5)	1.00	0042		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
GRANBGSSS36(0.5)	1.00	0046		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
SHERTASUS25(1.5)	1.00	0050		X	X	X	X	X	X	X	X	X				X				X	X		X	X	X		
AJAXWPSUS08(1.2)	10.00	0054															X										
AJAXWPSUS09(1.0)	10.00	0058															X										
CCV	1.00	0102		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	0106		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
MAGNTASSS15(0.5)	10.00	0111				X																					
MAGNTASSS15(0.5)(100	10.00	0115				X																					
MAGNPDSSS12(0.3)	10.00	0119				X																					
MAGNWPSUS14(3.0)	10.00	0123				X											X										
MAGNWPSUS14(3.0)L	50.00	0127				X											X										
MAGNWPSUS14(3.0)A	10.00	0131				X											X										
MAGNWPSUS14(3.0)D	10.00	0135				X											X										
MAGNWPSUS14(3.0)S	10.00	0139				X											X										
CCV	1.00	0143		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	0147		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICSA	1.00	0151		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
ICSAB	1.00	0155		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CRI	1.00	0200		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCV	1.00	0204		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		
CCB	1.00	0208		X	X	X	X	X	X	X	X	X				X	X			X	X		X	X	X		

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 08/28/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	1001															X				X									
S	1.00	1006																												
S	1.00	1010																			X									
S	1.00	1014															X													
LRS	1.00	1020															X				X									
LRS	1.00	1025															X				X									
LRS	1.00	1030															X				X									
ICV	1.00	1035															X				X									
ICB	1.00	1040															X				X									
ICSA	1.00	1045															X				X									
ICSAB	1.00	1050															X				X									
CRI	1.00	1055															X				X									
CCV	1.00	1101															X				X									
CCB	1.00	1106															X				X									
ZZZZZZ	1.00	1111																												
AJAXWPSUS10(2.0)	1.00	1116																			X									
ZZZZZZ	1.00	1121																												
ZZZZZZ	5.00	1126																												
ZZZZZZ	1.00	1131																												
ZZZZZZ	1.00	1136																												
ZZZZZZ	1.00	1141																												
MAGNPDSSS12(0.3)	100.00	1146															X													
ZZZZZZ	1.00	1151																												
CAPMWPSUS20(4.0)	1.00	1156																			X									
CCV	1.00	1201															X				X									
CCB	1.00	1206															X				X									
ZZZZZZ	1.00	1211																												
ICSA	1.00	1216															X				X									
ICSAB	1.00	1222															X				X									
CRI	1.00	1227															X				X									
CCV	1.00	1232															X				X									
CCB	1.00	1237															X				X									

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/04/03 End Date: 08/04/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1112																X									
S0.2	1.00	1114																X									
S0.5	1.00	1116																X									
S1	1.00	1117																X									
S5	1.00	1119																X									
S10	1.00	1121																X									
ICV	1.00	1123																X									
ICB	1.00	1125																X									
CRA	1.00	1126																X									
CCV	1.00	1128																X									
CCB	1.00	1130																X									
PBS0731A	1.00	1133																X									
LCSS0731A	1.00	1134																X									
ZZZZZZ	1.00	1136																									
ZZZZZZ	1.00	1138																									
ZZZZZZ	1.00	1140																									
ZZZZZZ	1.00	1142																									
ZZZZZZ	1.00	1144																									
ZZZZZZ	1.00	1146																									
ZZZZZZ	1.00	1148																									
CCV	1.00	1150																X									
CCB	1.00	1152																X									
ZZZZZZ	1.00	1153																									
ZZZZZZ	1.00	1155																									
ZZZZZZ	1.00	1157																									
ZZZZZZ	1.00	1159																									
ZZZZZZ	1.00	1201																									
ZZZZZZ	1.00	1203																									
SHERWPSUS23(3.5)	1.00	1205																X									
CAPMWPSUS20(4.0)	1.00	1207																X									
CAPMWPSUS21(2.5)	1.00	1208																X									
CCV	1.00	1210																X									
CCB	1.00	1212																X									
CAPMTASUS22(1.5)	1.00	1214																X									
SHERTASUS25(1.5)	1.00	1216																X									
CAPMWPSUS39(2.0)	1.00	1218																X									
GRANBGSSS34(0.5)	1.00	1220																X									
GRANBGSSS35(0.5)	1.00	1222																X									

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/04/03 End Date: 08/04/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN				
GRANBGSSS36(0.5)	1.00	1224																X												
ZZZZZZ	1.00	1226																												
ZZZZZZ	1.00	1228																												
ZZZZZZ	1.00	1230																												
CCV	1.00	1232																X												
CCB	1.00	1234																X												

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN				
S0	1.00	1016																X												
S0.2	1.00	1018																X												
S0.5	1.00	1019																X												
S1	1.00	1021																X												
S5	1.00	1023																X												
S10	1.00	1025																X												
ICV	1.00	1027																X												
ICB	1.00	1029																X												
CRA	1.00	1031																X												
CCV	1.00	1033																X												
CCB	1.00	1035																X												
ZZZZZZ	1.00	1036																												
ZZZZZZ	1.00	1038																												
ZZZZZZ	1.00	1040																												
ZZZZZZ	1.00	1042																												
ZZZZZZ	1.00	1044																												
ZZZZZZ	1.00	1046																												
ZZZZZZ	1.00	1048																												
ZZZZZZ	1.00	1049																												
ZZZZZZ	1.00	1051																												
CCV	1.00	1053																X												
CCB	1.00	1055																X												
ZZZZZZ	1.00	1057																												
ZZZZZZ	1.00	1058																												
ZZZZZZ	1.00	1100																												
ZZZZZZ	1.00	1102																												
ZZZZZZ	1.00	1104																												
ZZZZZZ	1.00	1105																												
ZZZZZZ	1.00	1107																												
ZZZZZZ	1.00	1109																												
ZZZZZZ	1.00	1111																												
CCV	1.00	1113																X												
CCB	1.00	1115																X												
ZZZZZZ	1.00	1116																												
ZZZZZZ	1.00	1118																												
ZZZZZZ	1.00	1120																												
ZZZZZZ	1.00	1122																												
ZZZZZZ	1.00	1124																												

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1126																										
ZZZZZZ	1.00	1128																										
ZZZZZZ	1.00	1130																										
PBS0808C	1.00	1131																X										
CCV	1.00	1133																X										
CCB	1.00	1135																X										
LCSS0808C	1.00	1137																X										
AJAXWPSUS08(1.2)	1.00	1139																X										
ZZZZZZ	1.00	1141																										
ZZZZZZ	1.00	1143																										
ZZZZZZ	1.00	1144																										
LUCABGSSS19(0.5)	1.00	1146																X										
MAGNTASUS18(1.5)	1.00	1148																X										
MAGNPDSSS12(0.3)	1.00	1150																X										
MAGNWPSSS16(0.5)	1.00	1152																X										
CCV	1.00	1154																X										
CCB	1.00	1156																X										
AJAXWPSUS10(2.0)	1.00	1157																X										
MAGNWPSUS14(3.0)	1.00	1159																X										
MAGNWPSUS14(3.0)D	1.00	1201																X										
MAGNWPSUS14(3.0)S	1.00	1203																X										
ZZZZZZ	1.00	1205																										
ZZZZZZ	1.00	1206																										
ZZZZZZ	1.00	1208																										
ZZZZZZ	1.00	1210																										
ZZZZZZ	1.00	1212																										
CCV	1.00	1213																X										
CCB	1.00	1215																X										

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1257																X									
S0.2	1.00	1259																X									
S0.5	1.00	1301																X									
S1	1.00	1302																X									
S5	1.00	1304																X									
S10	1.00	1306																X									
ICV	1.00	1308																X									
ICB	1.00	1309																X									
CRA	1.00	1311																X									
CCV	1.00	1313																X									
CCB	1.00	1314																X									
ZZZZZZ	10.00	1316																									
ZZZZZZ	10.00	1318																									
ZZZZZZ	10.00	1319																									
ZZZZZZ	10.00	1321																									
AJAXWPSUS09(1.0)	10.00	1323																X									
MAGNTASSS15(0.5)	10.00	1325																X									
MAGNTASSS15(0.5)(100	10.00	1326																X									
ZZZZZZ	10.00	1328																									
ZZZZZZ	10.00	1330																									
CCV	1.00	1332																X									
CCB	1.00	1334																X									
ZZZZZZ	10.00	1335																									
MAGNWPSUS17(2.0)	10.00	1337																X									
ZZZZZZ	10.00	1339																									
CCV	1.00	1341																X									
CCB	1.00	1343																X									

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Sample Data Summary Package For Metals

USEPA-CLP FORMS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
AJAXWPSUS08(1.2)SPLP	535439
AJAXWPSUS09(1.0)SPLP	535441
AJAXWPSUS10(2.0)SPLP	535453
CAPMWPSUS20(4.0)SPLP	534802
CAPMWPSUS21(2.5)SPLP	534804
CAPMWPSUS39(2.0)SPLP	534808
GRANBGSSS34(0.5)SPLP	534810
GRANBGSSS35(0.5)SPLP	534812
GRANBGSSS36(0.5)SPLP	534814
LUCABGSSS19(0.5)SPLP	535447
MAGNTASSS15(0.5)SPLP	535443
MAGNTASSS150.5100SPLP	535445
MAGNWPSSS16(0.5)SPLP	535451
MAGNWPSUS14(3.0)SPLP	535455
MAGNWPSUS143.0SPLPD	535455DP
MAGNWPSUS143.0SPLPS	535455MS
MAGNWPSUS17(2.0)SPLP	535457
SHERWPSUS23(3.5)SPLP	534800

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS08(1.2)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535439

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	46.4	B		P
7440-36-0	Antimony	4.3	B		P
7440-38-2	Arsenic	5.9	B		P
7440-39-3	Barium	11.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.38	B		P
7440-70-2	Calcium	12100			P
7440-47-3	Chromium	1.1	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	3.0	B		P
7439-89-6	Iron	66.7	U		P
7439-92-1	Lead	2.1	B		P
7439-95-4	Magnesium	3800	B		P
7439-96-5	Manganese	0.70	U		P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	1420	B		P
7782-49-2	Selenium	2.2	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	1220	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	6.8	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS09(1.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535441

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.3	U		P
7440-36-0	Antimony	4.0	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	7.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	10900			P
7440-47-3	Chromium	0.99	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	3.0	B		P
7439-89-6	Iron	66.7	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	2960	B		P
7439-96-5	Manganese	0.70	U		P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	706	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	12000			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPSUS10(2.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535453

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	284			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	107	B		P
7440-41-7	Beryllium	0.23	B		P
7440-43-9	Cadmium	0.94	B		P
7440-70-2	Calcium	1980	B		P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	25.3			P
7439-89-6	Iron	66.7	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	924	B		P
7439-96-5	Manganese	495			P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	11.2	B		P
7440-09-7	Potassium	3190	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5600			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	45.2			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS20(4.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534802

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	7060			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	4.7	B		P
7440-39-3	Barium	53.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	1270	B		P
7440-47-3	Chromium	2.7	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	6.1	B		P
7439-89-6	Iron	5440			P
7439-92-1	Lead	2.2	B		P
7439-95-4	Magnesium	834	B		P
7439-96-5	Manganese	54.7			P
7439-97-6	Mercury	16.5	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	794	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6250			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	14.4	B		P
7440-66-6	Zinc	22.3			P

Color Before: pale yellow Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS21(2.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534804

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	126	B		P
7440-36-0	Antimony	6.3	B		P
7440-38-2	Arsenic	21.2			P
7440-39-3	Barium	16.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	11200			P
7440-47-3	Chromium	0.96	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	8.7	B		P
7439-89-6	Iron	255			P
7439-92-1	Lead	2.3	B		P
7439-95-4	Magnesium	1190	B		P
7439-96-5	Manganese	5.0	B		P
7439-97-6	Mercury	20.2			CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2990	B		P
7782-49-2	Selenium	3.3	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5610			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	36.3			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPSUS39(2.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534808

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	3200			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.7	B		P
7440-39-3	Barium	32.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	766	B		P
7440-47-3	Chromium	1.9	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	6.0	B		P
7439-89-6	Iron	2170			P
7439-92-1	Lead	2.1	B		P
7439-95-4	Magnesium	320	B		P
7439-96-5	Manganese	51.0			P
7439-97-6	Mercury	17.1	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	479	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	16100			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	4.3	B		P
7440-66-6	Zinc	17.1	B		P

Color Before: pale yellow Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS34(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534810

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1010			P
7440-36-0	Antimony	4.1	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	11.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	777	B		P
7440-47-3	Chromium	0.99	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	4.7	B		P
7439-89-6	Iron	405			P
7439-92-1	Lead	3.0	B		P
7439-95-4	Magnesium	293	U		P
7439-96-5	Manganese	19.9			P
7439-97-6	Mercury	20.0			CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	651	B		P
7782-49-2	Selenium	3.0	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	17400			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	13.2	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS35(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534812

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1380			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	13.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	1200	B		P
7440-47-3	Chromium	1.1	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	5.0	B		P
7439-89-6	Iron	362			P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	293	U		P
7439-96-5	Manganese	6.8	B		P
7439-97-6	Mercury	14.4	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	475	B		P
7782-49-2	Selenium	2.3	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	15500			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	7.8	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGSSS36(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534814

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	10100			P
7440-36-0	Antimony	3.9	B		P
7440-38-2	Arsenic	6.5	B		P
7440-39-3	Barium	165	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	2040	B		P
7440-47-3	Chromium	4.9	B		P
7440-48-4	Cobalt	2.4	B		P
7440-50-8	Copper	8.5	B		P
7439-89-6	Iron	5070			P
7439-92-1	Lead	3.3			P
7439-95-4	Magnesium	930	B		P
7439-96-5	Manganese	211			P
7439-97-6	Mercury	21.0			CV
7440-02-0	Nickel	5.0	B		P
7440-09-7	Potassium	1770	B		P
7782-49-2	Selenium	3.7	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	18900			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	10.2	B		P
7440-66-6	Zinc	25.2			P

Color Before: pale yellow Clarity Before: clear Texture:

Color After: pale yellow Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
LUCABGSSS19(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535447

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	534			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	9.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.33	B		P
7440-70-2	Calcium	1440	B		P
7440-47-3	Chromium	1.1	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	3.9	B		P
7439-89-6	Iron	266			P
7439-92-1	Lead	1.7	B		P
7439-95-4	Magnesium	347	B		P
7439-96-5	Manganese	31.4			P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	711	B		P
7782-49-2	Selenium	2.0	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5140			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNTASSS15(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535443

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	54.5	B		P
7440-36-0	Antimopy	7.5	B		P
7440-38-2	Arsenic	18.1			P
7440-39-3	Barium	10.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	1950	B		P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	6.9	B		P
7439-89-6	Iron	392			P
7439-92-1	Lead	17.9			P
7439-95-4	Magnesium	802	B		P
7439-96-5	Manganese	4.0	B		P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	743	B		P
7782-49-2	Selenium	2.7	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6950			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	12.0	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNTASSS150.5100SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535445

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	34.0	B		P
7440-36-0	Antimony	7.5	B		P
7440-38-2	Arsenic	18.8			P
7440-39-3	Barium	10.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	1750	B		P
7440-47-3	Chromium	0.93	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	3.8	B		P
7439-89-6	Iron	294			P
7439-92-1	Lead	16.4			P
7439-95-4	Magnesium	630	B		P
7439-96-5	Manganese	3.6	B		P
7439-97-6	Mercury	12.2	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	384	B		P
7782-49-2	Selenium	3.6	B		P
7440-22-4	Silver	0.96	B		P
7440-23-5	Sodium	17000			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSSS16(0.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535451

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1840			P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	6.1	B		P
7440-39-3	Barium	54.2	B		P
7440-41-7	Beryllium	0.36	B		P
7440-43-9	Cadmium	1.4	B		P
7440-70-2	Calcium	60900			P
7440-47-3	Chromium	5.2	B		P
7440-48-4	Cobalt	19.5	B		P
7440-50-8	Copper	97.7			P
7439-89-6	Iron	3880			P
7439-92-1	Lead	72.6			P
7439-95-4	Magnesium	1940	B		P
7439-96-5	Manganese	1050			P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	17.1	B		P
7440-09-7	Potassium	1120	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	3630	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	122			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSUS14(3.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535455

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.3	U		P
7440-36-0	Antimony	5.3	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	29.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	2.5	B		P
7440-70-2	Calcium	359000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	3.0	B		P
7440-50-8	Copper	3.2	B		P
7439-89-6	Iron	66.7	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	31200			P
7439-96-5	Manganese	5740			P
7439-97-6	Mercury	10.0	U		CV
7440-02-0	Nickel	29.8	B		P
7440-09-7	Potassium	3030	B		P
7782-49-2	Selenium	4.7	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6330			P
7440-28-0	Thallium	4.7	B		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPSUS17(2.0)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 535457

Level (low/med): LOW Date Received: 07/22/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	18.3	U		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	11.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	13800			P
7440-47-3	Chromium	0.89	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	2.9	B		P
7439-89-6	Iron	66.7	U		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	2710	B		P
7439-96-5	Manganese	1.3	B		P
7439-97-6	Mercury	12.4	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	933	B		P
7782-49-2	Selenium	2.6	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5280			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

SHERWPSUS23(3.5)SPLP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Lab Sample ID: 534800

Level (low/med): LOW Date Received: 07/18/03

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	737			P
7440-36-0	Antimony	5.7	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	7.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	453	B		P
7440-47-3	Chromium	1.3	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	6.3	B		P
7439-89-6	Iron	427			P
7439-92-1	Lead	19.2			P
7439-95-4	Magnesium	293	U		P
7439-96-5	Manganese	12.3	B		P
7439-97-6	Mercury	11.2	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	1080	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	1.2	B		P
7440-23-5	Sodium	1300	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	13.7	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	25810.00	99.3	30200.0	31060.00	102.8	30110.00	99.7	P
Antimony	250.0	242.00	96.8	300.0	306.70	102.2	298.40	99.5	P
Arsenic	250.0	243.70	97.5	100.0	103.00	103.0	97.80	97.8	P
Barium	500.0	495.80	99.2	200.0	207.50	103.8	201.30	100.6	P
Beryllium	500.0	502.10	100.4	100.0	102.20	102.2	100.40	100.4	P
Cadmium	500.0	491.20	98.2	100.0	100.80	100.8	98.51	98.5	P
Calcium	25000.0	25380.00	101.5	30200.0	31100.00	103.0	30330.00	100.4	P
Chromium	500.0	498.20	99.6	200.0	201.50	100.8	197.90	99.0	P
Cobalt	500.0	490.30	98.1	200.0	204.20	102.1	197.80	98.9	P
Copper	500.0	503.70	100.7	200.0	211.30	105.6	205.30	102.6	P
Lead	1000.0	977.30	97.7	400.0	396.90	99.2	387.90	97.0	P
Manganese	500.0	493.20	98.6	200.0	204.00	102.0	198.90	99.4	P
Mercury	3.0	2.78	92.7	5.0	4.72	94.4	4.57	91.4	CV
Nickel	500.0	496.50	99.3	200.0	203.90	102.0	198.70	99.4	P
Potassium	25000.0	26620.00	106.5	30200.0	32600.00	107.9	31630.00	104.7	P
Selenium	250.0	240.50	96.2	100.0	104.70	104.7	102.30	102.3	P
Silver	500.0	497.10	99.4	100.0	104.10	104.1	101.60	101.6	P
Sodium	25000.0	24260.00	97.0	30200.0	30470.00	100.9	29520.00	97.7	P
Thallium	250.0	234.70	93.9	100.0	96.56	96.6	98.34	98.3	P
Vanadium	500.0	493.70	98.7	200.0	202.40	101.2	197.00	98.5	P
Zinc	500.0	494.00	98.8	200.0	203.30	101.6	200.70	100.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum				30200.0	30670.00	101.6	30630.00	101.4	P
Antimony				300.0	303.30	101.1	305.20	101.7	P
Arsenic				100.0	101.40	101.4	99.89	99.9	P
Barium				200.0	204.40	102.2	205.10	102.6	P
Beryllium				100.0	103.30	103.3	103.00	103.0	P
Cadmium				100.0	101.70	101.7	101.20	101.2	P
Calcium				30200.0	31320.00	103.7	31290.00	103.6	P
Chromium				200.0	203.00	101.5	203.00	101.5	P
Cobalt				200.0	203.60	101.8	203.80	101.9	P
Copper				200.0	208.40	104.2	209.20	104.6	P
Lead				400.0	399.30	99.8	398.70	99.7	P
Manganese				200.0	204.40	102.2	204.30	102.2	P
Mercury				5.0	4.68	93.6			CV
Nickel				200.0	204.40	102.2	205.40	102.7	P
Potassium				30200.0	31850.00	105.5	31910.00	105.7	P
Selenium				100.0	103.80	103.8	103.90	103.9	P
Silver				100.0	103.00	103.0	103.40	103.4	P
Sodium				30200.0	29880.00	98.9	29880.00	98.9	P
Thallium				100.0	100.20	100.2	99.88	99.9	P
Vanadium				200.0	202.10	101.0	201.60	100.8	P
Zinc				200.0	207.60	103.8	206.30	103.2	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	30970.00	102.5			P
Antimony				300.0	309.30	103.1			P
Arsenic				100.0	101.30	101.3			P
Barium				200.0	206.80	103.4			P
Beryllium				100.0	103.60	103.6			P
Cadmium				100.0	102.60	102.6			P
Calcium				30200.0	31570.00	104.5			P
Chromium				200.0	204.00	102.0			P
Cobalt				200.0	204.90	102.4			P
Copper				200.0	211.50	105.8			P
Lead				400.0	398.00	99.5			P
Manganese				200.0	205.30	102.6			P
Nickel				200.0	206.70	103.4			P
Potassium				30200.0	32050.00	106.1			P
Selenium				100.0	102.50	102.5			P
Silver				100.0	103.80	103.8			P
Sodium				30200.0	30040.00	99.5			P
Thallium				100.0	102.10	102.1			P
Vanadium				200.0	204.00	102.0			P
Zinc				200.0	207.60	103.8			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Iron	25500.0	26200.00	102.7	30200.0	30130.00	99.8	30260.00	100.2	P
Magnesium	25000.0	25430.00	101.7	30200.0	29900.00	99.0	30060.00	99.5	P
Mercury	3.0	2.94	98.0	5.0	4.96	99.2	4.88	97.6	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Iron				30200.0	30400.00	100.7	30490.00	101.0	P
Magnesium				30200.0	30210.00	100.0	30310.00	100.4	P
Mercury				5.0	4.87	97.4	4.65	93.0	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Iron				30200.0	30410.00	100.7			P
Magnesium				30200.0	30160.00	99.9			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	25380.00	97.6	30200.0	29750.00	98.5	29710.00	98.4	P
Antimony	250.0	251.70	100.7	300.0	304.60	101.5	305.70	101.9	P
Arsenic	250.0	243.50	97.4	100.0	100.60	100.6	102.50	102.5	P
Barium	500.0	490.00	98.0	200.0	199.10	99.6	199.10	99.6	P
Beryllium	500.0	502.20	100.4	100.0	100.00	100.0	100.90	100.9	P
Cadmium	500.0	488.40	97.7	100.0	97.70	97.7	98.65	98.6	P
Calcium	25000.0	24700.00	98.8	30200.0	30050.00	99.5	30230.00	100.1	P
Chromium	500.0	496.40	99.3	200.0	196.70	98.4	198.70	99.4	P
Cobalt	500.0	488.10	97.6	200.0	197.30	98.6	198.70	99.4	P
Copper	500.0	501.10	100.2	200.0	203.00	101.5	202.40	101.2	P
Iron	25500.0	25560.00	100.2	30200.0	29940.00	99.1	30240.00	100.1	P
Magnesium	25000.0	24850.00	99.4	30200.0	29840.00	98.8	30260.00	100.2	P
Manganese	500.0	488.60	97.7	200.0	197.20	98.6	198.70	99.4	P
Nickel	500.0	493.70	98.7	200.0	196.40	98.2	197.40	98.7	P
Potassium	25000.0	26940.00	107.8	30200.0	31330.00	103.7	31430.00	104.1	P
Selenium	250.0	243.50	97.4	100.0	102.50	102.5	97.77	97.8	P
Silver	500.0	494.00	98.8	100.0	99.92	99.9	98.99	99.0	P
Sodium	25000.0	24260.00	97.0	30200.0	29150.00	96.5	28700.00	95.0	P
Thallium	250.0	237.90	95.2	100.0	98.50	98.5	98.88	98.9	P
Vanadium	500.0	491.00	98.2	200.0	196.90	98.4	199.10	99.6	P
Zinc	500.0	494.40	98.9	200.0	197.70	98.8	198.80	99.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29550.00	97.8	29570.00	97.9	P
Antimony				300.0	302.40	100.8	302.20	100.7	P
Arsenic				100.0	100.30	100.3	100.50	100.5	P
Barium				200.0	197.40	98.7	195.60	97.8	P
Beryllium				100.0	100.40	100.4	101.00	101.0	P
Cadmium				100.0	98.10	98.1	99.82	99.8	P
Calcium				30200.0	30180.00	99.9	30650.00	101.5	P
Chromium				200.0	198.50	99.2	201.20	100.6	P
Cobalt				200.0	199.00	99.5	202.20	101.1	P
Copper				200.0	200.00	100.0	197.80	98.9	P
Iron				30200.0	30140.00	99.8	30520.00	101.1	P
Magnesium				30200.0	30270.00	100.2	31090.00	102.9	P
Manganese				200.0	197.90	99.0	199.70	99.8	P
Nickel				200.0	196.20	98.1	201.00	100.5	P
Potassium				30200.0	31400.00	104.0	31780.00	105.2	P
Selenium				100.0	96.98	97.0	95.00	95.0	P
Silver				100.0	97.84	97.8	98.27	98.3	P
Sodium				30200.0	28710.00	95.1	29190.00	96.7	P
Thallium				100.0	99.05	99.0	101.80	101.8	P
Vanadium				200.0	198.60	99.3	201.10	100.6	P
Zinc				200.0	197.10	98.6	196.80	98.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29500.00	97.7			P
Antimony				300.0	302.00	100.7			P
Arsenic				100.0	100.60	100.6			P
Barium				200.0	194.90	97.4			P
Beryllium				100.0	100.60	100.6			P
Cadmium				100.0	99.85	99.8			P
Calcium				30200.0	30630.00	101.4			P
Chromium				200.0	201.40	100.7			P
Cobalt				200.0	202.00	101.0			P
Copper				200.0	199.70	99.8			P
Iron				30200.0	30410.00	100.7			P
Magnesium				30200.0	30920.00	102.4			P
Manganese				200.0	198.40	99.2			P
Nickel				200.0	201.40	100.7			P
Potassium				30200.0	31400.00	104.0			P
Selenium				100.0	97.99	98.0			P
Silver				100.0	101.20	101.2			P
Sodium				30200.0	29140.00	96.5			P
Thallium				100.0	102.80	102.8			P
Vanadium				200.0	201.00	100.5			P
Zinc				200.0	196.80	98.4			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	998.00	99.8	400.0	394.50	98.6	394.10	98.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead				400.0	388.50	97.1	388.10	97.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	678.70	169.7	766.40	191.6
Antimony				120.0	118.00	98.3	117.30	97.8
Arsenic				20.0	19.22	96.1	20.67	103.4
Barium				400.0	387.90	97.0	397.00	99.2
Beryllium				10.0	10.21	102.1	10.50	105.0
Cadmium				10.0	10.47	104.7	10.57	105.7
Calcium				10000.0	10570.00	105.7	11010.00	110.1
Chromium				20.0	21.46	107.3	22.34	111.7
Cobalt				100.0	95.84	95.8	97.76	97.8
Copper				50.0	49.27	98.5	51.33	102.7
Lead				6.0	5.16	86.0	4.87	81.2
Manganese				30.0	29.37	97.9	30.22	100.7
Mercury	0.2	0.30	150.0					
Nickel				80.0	78.54	98.2	81.44	101.8
Potassium				10000.0	11610.00	116.1	11720.00	117.2
Selenium				10.0	10.88	108.8	10.67	106.7
Silver				20.0	19.80	99.0	19.81	99.0
Sodium				10000.0	9563.00	95.6	9670.00	96.7
Thallium				20.0	19.29	96.4	16.49	82.4
Vanadium				100.0	97.66	97.7	99.26	99.3
Zinc				40.0	39.99	100.0	41.74	104.4

Control Limits: no limits have been established by EPA at this time

2B-IN
CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Iron				200.0	300.70	150.4	267.20	133.6
Magnesium				10000.0	10340.00	103.4	10320.00	103.2
Mercury	0.2	0.20	100.0					

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Found	%R	Final Found	%R
Aluminum				400.0	562.40	140.6	603.50	150.9
Antimony				120.0	123.20	102.7	124.10	103.4
Arsenic				20.0	21.31	106.6	24.06	120.3
Barium				400.0	392.20	98.0	387.60	96.9
Beryllium				10.0	10.36	103.6	10.62	106.2
Cadmium				10.0	10.16	101.6	10.43	104.3
Calcium				10000.0	10360.00	103.6	10640.00	106.4
Chromium				20.0	20.76	103.8	22.36	111.8
Cobalt				100.0	97.18	97.2	99.30	99.3
Copper				50.0	50.95	101.9	49.33	98.7
Iron				200.0	280.80	140.4	324.70	162.4
Magnesium				10000.0	10210.00	102.1	10610.00	106.1
Manganese				30.0	29.70	99.0	30.11	100.4
Nickel				80.0	79.42	99.3	82.68	103.4
Potassium				10000.0	11110.00	111.1	11380.00	113.8
Selenium				10.0	13.44	134.4	7.03	70.3
Silver				20.0	19.68	98.4	19.18	95.9
Sodium				10000.0	9707.00	97.1	9879.00	98.8
Thallium				20.0	20.21	101.0	19.99	100.0
Vanadium				100.0	99.17	99.2	98.34	98.3
Zinc				40.0	38.31	95.8	38.50	96.2

Control Limits: no limits have been established by EPA at this time

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Lead				6.0	6.24	104.0	7.14	119.0

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank Method Blank	C	M
Aluminum	18.3	U	18.3	U	18.3	U	18.3	U	20.700	B	P
Antimony	3.8	U	3.8	U	3.8	U	3.8	U	4.069	B	P
Arsenic	2.4	U	2.4	U	2.4	U	2.4	U	2.400	U	P
Barium	7.3	U	7.3	U	7.3	U	7.3	U	7.300	U	P
Beryllium	0.4	B	0.2	U	0.2	U	0.3	B	-0.688	B	P
Cadmium	0.3	U	0.3	U	0.3	B	0.3	B	0.300	U	P
Calcium	223.2	U	223.2	U	223.2	U	223.2	U	223.200	U	P
Chromium	0.6	U	0.6	U	0.6	U	0.6	U	0.600	U	P
Cobalt	1.8	U	1.8	U	1.8	U	1.8	U	1.800	U	P
Copper	1.4	U	1.4	U	1.4	B	1.8	B	1.646	B	P
Iron									66.700	U	P
Lead	1.5	U	1.5	U	1.5	U	1.5	U	1.500	U	P
Magnesium									292.800	U	P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U	0.700	U	P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.150	B	CV
Nickel	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Potassium	250.0	U	250.0	U	250.0	U	250.0	U	250.000	U	P
Selenium	1.7	U	2.6	B	1.7	U	2.6	B	1.700	U	P
Silver	0.9	U	0.9	U	0.9	U	0.9	U	0.900	U	P
Sodium	218.8	U	218.8	U	218.8	U	218.8	U	218.800	U	P
Thallium	2.8	U	2.8	U	2.8	U	2.8	U	-3.000	B	P
Vanadium	2.2	U	2.2	U	2.2	U	2.2	U	2.200	U	P
Zinc	5.7	U	5.7	U	5.7	U	5.7	U	5.700	U	P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank method Blank	C	M
Aluminum			18.3	U	18.3	U			18.300	U	P
Antimony			3.8	U	3.8	U			3.800	U	P
Arsenic			2.4	U	2.4	U			2.400	U	P
Barium			7.3	U	7.3	U			7.300	U	P
Beryllium			0.2	U	0.2	U			0.200	U	P
Cadmium			0.3	U	0.3	U			0.300	U	P
Calcium			223.2	U	223.2	U			223.200	U	P
Chromium			0.6	U	0.6	U			1.199	B	P
Cobalt			1.8	U	1.8	U			1.800	U	P
Copper			1.4	U	1.4	U			1.686	B	P
Lead			1.5	U	-1.9	B			1.504	B	P
Manganese			0.7	U	0.7	U			0.700	U	P
Nickel			2.0	U	2.0	U			2.000	U	P
Potassium			250.0	U	250.0	U			250.000	U	P
Selenium			3.0	B	1.9	B			1.700	U	P
Silver			0.9	U	0.9	U			0.900	U	P
Sodium			218.8	U	218.8	U			218.800	U	P
Thallium			2.8	U	2.8	U			2.800	U	P
Vanadium			2.2	U	2.2	U			2.200	U	P
Zinc			5.7	U	5.7	U			9.452	B	P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank EBLKP8	C	M
Aluminum									18.300	U	P
Antimony									3.800	U	P
Arsenic									2.400	U	P
Barium									7.300	U	P
Beryllium									-0.393	B	P
Cadmium									0.300	U	P
Calcium									426.400	B	P
Chromium									0.863	B	P
Cobalt									1.800	U	P
Copper									2.916	B	P
Iron									66.700	U	P
Lead									1.500	U	P
Magnesium									292.800	U	P
Manganese									0.700	U	P
Mercury									10.000	U	CV
Nickel									2.000	U	P
Potassium									250.000	U	P
Selenium									3.755	B	P
Silver									0.900	U	P
Sodium									5927.000		P
Thallium									2.800	U	P
Vanadium									2.200	U	P
Zinc									5.700	U	P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank Method Blank	C	M
Iron	66.7	U	66.7	U	66.7	U	66.7	U	66.700	U	P
Magnesium	292.8	U	292.8	U	292.8	U	292.8	U	292.800	U	P

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Iron			66.7	U	66.7	U					P
Magnesium			292.8	U	292.8	U					P
Mercury	0.1	U	0.1	U	0.1	U	-0.2	B	0.100	U	CV

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank EBLKN9	C	M
Aluminum									70.500	B	P
Antimony									4.700	U	P
Arsenic									4.800	U	P
Barium									16.060	B	P
Beryllium									0.200	U	P
Cadmium									0.600	U	P
Calcium									752.900	B	P
Chromium									1.400	U	P
Cobalt									2.000	U	P
Copper									5.834	B	P
Iron									33.300	U	P
Lead									39.990		P
Magnesium									226.600	B	P
Manganese									0.704	B	P
Mercury			0.1	U					10.000	U	CV
Nickel									2.100	U	P
Potassium									393.000	U	P
Selenium									3.400	U	P
Silver									2.200	U	P
Sodium									5031.000		P
Thallium									5.700	U	P
Vanadium									2.000	U	P
Zinc									22.690		P

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	-43.7	B			P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U			P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U			P
Barium	5.9	U	5.9	U	5.9	U	5.9	U			P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U			P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U			P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U			P
Chromium	1.4	U	1.4	U	1.4	U	-1.5	B			P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U			P
Copper	2.4	U	2.4	U	2.4	U	-3.0	B			P
Iron	71.7	B	33.3	U	33.3	U	-38.4	B			P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U			P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Nickel	2.1	U	2.1	U	2.1	U	2.1	U			P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U			P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U			P
Silver	2.2	U	2.2	U	2.2	U	-3.6	B			P
Sodium	472.7	U	472.7	U	472.7	U	-606.8	B			P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U			P
Vanadium	2.0	U	2.0	U	2.0	U	-2.4	B			P
Zinc	-1.8	B	-2.2	B	-2.3	B	-2.6	B			P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			-36.3	B	-38.0	B					P
Antimony			4.7	U	4.7	U					P
Arsenic			4.8	U	4.8	U					P
Barium			5.9	U	5.9	U					P
Beryllium			0.2	B	0.3	B					P
Cadmium			0.6	U	0.6	U					P
Calcium			182.1	U	182.1	U					P
Chromium			1.4	U	1.4	U					P
Cobalt			2.0	U	2.0	U					P
Copper			2.4	U	2.4	U					P
Iron			33.3	U	33.3	U					P
Magnesium			178.3	U	178.3	U					P
Manganese			0.7	U	0.7	U					P
Nickel			2.1	U	2.1	U					P
Potassium			472.4	B	429.2	B					P
Selenium			3.4	U	3.4	U					P
Silver			2.2	U	2.2	U					P
Sodium			479.6	B	472.7	U					P
Thallium			5.7	U	5.7	U					P
Vanadium			2.0	U	2.0	U					P
Zinc			-2.2	B	-2.3	B					P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead	1.9	B	1.5	U	1.5	U	1.5	U			P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead			1.5	U							P

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	452460	477800	467400.0	103.3	471600	481600.0	106.4
Antimony	0	572	3	622.1	108.8	5	640.4	112.0
Arsenic	0	94	1	101.0	107.4	-1	103.9	110.5
Barium	0	466	2	506.8	108.8	2	522.9	112.2
Beryllium	0	446	-1	484.3	108.6	-1	501.9	112.5
Cadmium	0	874	8	955.3	109.3	8	986.0	112.8
Calcium	500000	421280	481200	468100.0	111.1	474000	484200.0	114.9
Chromium	0	436	5	478.4	109.7	4	491.6	112.8
Cobalt	0	435	9	472.8	108.7	8	484.6	111.4
Copper	0	473	4	530.9	112.2	4	545.0	115.2
Lead	0	44	-4	43.8	99.5	-2	45.4	103.2
Manganese	0	428	0	472.3	110.4	0	486.6	113.7
Nickel	0	877	12	965.9	110.1	11	995.8	113.5
Potassium	0	0	349	218.0		228	276.7	
Selenium	0	48	-1	50.7	105.6	4	54.7	114.0
Silver	0	196	1	218.4	111.4	0	222.6	113.6
Sodium	0	0	-37	-250.1		-80	-380.2	
Thallium	0	95	5	100.9	106.2	3	104.3	109.8
Vanadium	0	417	-2	458.3	109.9	-3	471.1	113.0
Zinc	0	841	9	966.6	114.9	9	1002.0	119.1

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Iron	200000	179960	198200	196000.0	108.9	199400	195300.0	108.5
Magnesium	500000	480220	516400	516700.0	107.6	519100	515700.0	107.4

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	477680	501800	499900.0	104.7	500700	504200.0	105.6
Antimony	0	575	0	611.8	106.4	1	616.7	107.3
Arsenic	0	97	3	97.0	100.0	4	103.3	106.5
Barium	0	464	2	496.0	106.9	2	495.4	106.8
Beryllium	0	444	0	478.8	107.8	0	489.6	110.3
Cadmium	0	874	-3	927.9	106.2	-2	957.4	109.5
Calcium	500000	476380	498900	502800.0	105.5	511900	521100.0	109.4
Chromium	0	451	3	480.1	106.5	4	493.1	109.3
Cobalt	0	434	-1	455.5	105.0	0	468.2	107.9
Copper	0	482	4	507.0	105.2	5	504.3	104.6
Iron	200000	192500	201900	198200.0	103.0	205700	204000.0	106.0
Magnesium	500000	524140	532400	535100.0	102.1	550100	557000.0	106.3
Manganese	0	451	1	479.0	106.2	2	489.0	108.4
Nickel	0	876	0	920.0	105.0	1	946.1	108.0
Potassium	0	0	-162	-198.6		204	119.1	
Selenium	0	41	-10	37.2	90.7	-15	34.1	83.2
Silver	0	198	0	209.6	105.9	0	210.5	106.3
Sodium	0	0	-253	-378.0		-216	-377.5	
Thallium	0	83	-2	90.7	109.3	-1	87.8	105.8
Vanadium	0	464	5	499.0	107.5	5	507.2	109.3
Zinc	0	951	-2	987.2	103.8	-3	1000.0	105.2

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	44	1	46.5	105.7	-2	44.0	100.0

USEPA-CLP FORMS

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

MAGNWPSUS143.0SPLPS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Arsenic	75 - 125	981.8000		2.4000	U	1000.00	98.2		P
Barium	75 - 125	2099.0000		29.9300	B	2000.00	103.5		P
Cadmium	75 - 125	51.5900		2.5100	B	50.00	98.2		P
Chromium	75 - 125	201.1000		0.6000	U	200.00	100.6		P
Copper	75 - 125	270.2000		3.2310	B	250.00	106.8		P
Lead	75 - 125	492.7000		1.5000	U	500.00	98.5		P
Mercury	75 - 125	101.0000		10.0000	U	100.00	101.0		CV
Nickel	75 - 125	526.5000		29.8500	B	500.00	99.3		P
Selenium	75 - 125	1993.0000		4.6650	B	2000.00	99.4		P
Silver	75 - 125	526.2000		0.9000	U	500.00	105.2		P
Zinc	75 - 125	502.0000		5.7000	U	500.00	100.4		P

Comments:

USEPA-CLP FORMS

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

MAGNWPSUS14(3.0)SPLPA

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		2204.00		18.30	U	2000.0	110.2		P
Antimony		528.20		5.26	B	500.0	104.6		P
Arsenic		37.13		2.40	U	40.0	92.8		P
Barium		2111.00		29.93	B	2000.0	104.1		P
Beryllium		51.65		0.20	U	50.0	103.3		P
Cadmium		53.52		2.51	B	50.0	102.0		P
Chromium		209.40		0.60	U	200.0	104.7		P
Cobalt		508.50		3.01	B	500.0	101.1		P
Copper		278.30		3.23	B	250.0	110.0		P
Iron		1149.00		66.70	U	1000.0	114.9		P
Lead		20.80		1.50	U	20.0	104.0		P
Manganese		6126.00		5739.00		500.0	77.4		P
Nickel		541.10		29.85	B	500.0	102.2		P
Selenium		14.02		4.66	B	10.0	93.6		P
Silver		55.23		0.90	U	50.0	110.5		P
Thallium		55.16		4.75	B	50.0	100.8		P
Vanadium		526.00		2.20	U	500.0	105.2		P
Zinc		522.30		5.70	U	500.0	104.5		P

Comments:

6

DUPLICATES

SAMPLE NO.

MAGNWPSUS143.0SPLPD

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		18.3000	U	18.3000	U			P
Antimony		5.2650	B	4.2270	B	21.9		P
Arsenic		2.4000	U	2.4000	U			P
Barium		29.9300	B	30.4500	B	1.7		P
Beryllium		0.2000	U	0.2000	U			P
Cadmium		2.5100	B	2.1760	B	14.3		P
Calcium		358800.0000		359800.0000		0.3		P
Chromium		0.6000	U	0.6000	U			P
Cobalt		3.0110	B	2.8280	B	6.3		P
Copper		3.2310	B	4.3470	B	29.5		P
Iron		66.7000	U	66.7000	U			P
Lead		1.5000	U	1.5000	U			P
Magnesium		31170.0000		31740.0000		1.8		P
Manganese		5739.0000		5781.0000		0.7		P
Mercury		10.0000	U	10.2000	B	200.0		CV
Nickel		29.8500	B	30.4000	B	1.8		P
Potassium		3034.0000	B	3063.0000	B	1.0		P
Selenium	5.0	4.6650	B	6.0690		26.2		P
Silver		0.9000	U	0.9000	U			P
Sodium	5000.0	6328.0000		6387.0000		0.9		P
Thallium		4.7480	B	3.2260	B	38.2		P
Vanadium		2.2000	U	2.2000	U			P
Zinc		5.7000	U	5.7000	U			P

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	51000.0	52480.00	102.9					
Antimony	2000.0	2033.00	101.6					
Arsenic	1050.0	1043.00	99.3					
Barium	500.0	511.90	102.4					
Beryllium	500.0	501.80	100.4					
Cadmium	525.0	514.70	98.0					
Calcium	50000.0	50880.00	101.8					
Chromium	500.0	501.70	100.3					
Cobalt	500.0	492.50	98.5					
Copper	500.0	530.90	106.2					
Iron	50500.0	52920.00	104.8					
Lead	1015.0	981.80	96.7					
Magnesium	50000.0	51860.00	103.7					
Manganese	500.0	498.20	99.6					
Mercury	1.0	0.94	94.0					
Nickel	500.0	495.00	99.0					
Potassium	50000.0	51510.00	103.0					
Selenium	525.0	507.90	96.7					
Silver	500.0	456.30	91.3					
Sodium	50000.0	51930.00	103.9					
Thallium	550.0	521.70	94.9					
Vanadium	500.0	499.40	99.9					
Zinc	500.0	494.30	98.9					

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Aluminum	51000.0	50370.00	98.8					
Antimony	2000.0	1943.00	97.2					
Arsenic	1050.0	991.50	94.4					
Barium	500.0	490.80	98.2					
Beryllium	500.0	483.90	96.8					
Cadmium	525.0	494.90	94.3					
Calcium	50000.0	49060.00	98.1					
Chromium	500.0	482.90	96.6					
Cobalt	500.0	472.10	94.4					
Copper	500.0	506.90	101.4					
Lead	1015.0	942.00	92.8					
Manganese	500.0	479.20	95.8					
Nickel	500.0	478.10	95.6					
Potassium	50000.0	49430.00	98.9					
Selenium	525.0	483.30	92.1					
Silver	500.0	410.60	82.1					
Sodium	50000.0	49550.00	99.1					
Thallium	550.0	499.30	90.8					
Vanadium	500.0	480.70	96.1					
Zinc	500.0	478.60	95.7					

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Iron	50500.0	50680.00	100.4					
Magnesium	50000.0	49710.00	99.4					
Mercury	1.0	0.92	92.0					

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	51000.0	51180.00	100.4						
Antimony	2000.0	1985.00	99.2						
Arsenic	1050.0	1017.00	96.9						
Barium	500.0	498.00	99.6						
Beryllium	500.0	495.70	99.1						
Cadmium	525.0	508.60	96.9						
Calcium	50000.0	50400.00	100.8						
Chromium	500.0	494.80	99.0						
Cobalt	500.0	484.30	96.9						
Copper	500.0	514.90	103.0						
Lead	1015.0	961.70	94.7						
Manganese	500.0	490.60	98.1						
Nickel	500.0	489.60	97.9						
Potassium	50000.0	49870.00	99.7						
Selenium	525.0	494.20	94.1						
Silver	500.0	419.40	83.9						
Sodium	50000.0	50310.00	100.6						
Thallium	550.0	513.60	93.4						
Vanadium	500.0	491.30	98.3						
Zinc	500.0	494.30	98.9						

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits	%R
Iron	50500.0	50780.00	100.6					
Magnesium	50000.0	49820.00	99.6					

9
ICP SERIAL DILUTIONS

SAMPLE NO.

SHERWPSUS23(3.5)SPLPL

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	736.70		663.50	B	9.9		P
Antimony	5.67	B	19.00	U	100.0		P
Arsenic	2.40	U	12.00	U			P
Barium	7.91	B	36.50	U	100.0		P
Beryllium	0.20	U	1.00	U			P
Cadmium	0.30	U	1.50	U			P
Calcium	452.60	B	1116.00	U	100.0		P
Chromium	1.30	B	3.00	U	100.0		P
Cobalt	1.80	U	9.00	U			P
Copper	6.26	B	9.91	B	58.3		P
Iron	427.10		397.90	B	6.8		P
Lead	19.16		15.19		20.7		P
Magnesium	292.80	U	1464.00	U			P
Manganese	12.33	B	12.85	B	4.2		P
Nickel	2.00	U	10.00	U			P
Potassium	1084.00	B	1250.00	U	100.0		P
Selenium	1.70	U	8.50	U			P
Silver	1.15	B	4.50	U	100.0		P
Sodium	1296.00	B	1204.00	B	7.1		P
Thallium	2.80	U	14.00	U			P
Vanadium	2.20	U	11.00	U			P
Zinc	13.72	B	28.50	U	100.0		P

9
ICP SERIAL DILUTIONS

SAMPLE NO.

MAGNWPSUS14(3.0)SPLPL

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	18.30	U	91.50	U			P
Antimony	5.26	B	19.00	U	100.0		P
Arsenic	2.40	U	12.00	U			P
Barium	29.93	B	36.50	U	100.0		P
Beryllium	0.20	U	1.00	U			P
Cadmium	2.51	B	3.27	B	30.3		P
Calcium	358800.00		378100.00		5.4		P
Chromium	0.60	U	3.00	U			P
Cobalt	3.01	B	9.00	U	100.0		P
Copper	3.23	B	7.00	U	100.0		P
Iron	66.70	U	333.50	U			P
Lead	1.50	U	7.50	U			P
Magnesium	31170.00		32300.00		3.6		P
Manganese	5739.00		5800.00		1.1		P
Nickel	29.85	B	32.95	B	10.4		P
Potassium	3034.00	B	2966.00	B	2.2		P
Selenium	4.66	B	19.94	B	327.9		P
Silver	0.90	U	4.50	U			P
Sodium	6328.00		6332.00	B	0.1		P
Thallium	4.75	B	14.00	U	100.0		P
Vanadium	2.20	U	11.00	U			P
Zinc	5.70	U	28.50	U			P

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: Date: 07/01/03

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments:

USEPA-CLP FORMS

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Iron	271.441		100	33.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Selenium	196.026		5	3.4	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Thallium	190.864		10	5.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Iron	271.441		100	66.7	P
Magnesium	279.079		5000	292.8	P

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	18.3	P
Antimony	206.838		60	3.8	P
Arsenic	189.042		10	2.4	P
Barium	493.409		200	7.3	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.3	P
Calcium	317.933		5000	223.2	P
Chromium	267.716		10	0.6	P
Cobalt	228.616		50	1.8	P
Copper	324.754		25	1.4	P
Lead	220.353		3	1.5	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.0	P
Potassium	766.491		5000	250.0	P
Selenium	196.026		5	1.7	P
Silver	328.068		10	0.9	P
Sodium	330.232		5000	218.8	P
Thallium	190.864		10	2.8	P
Vanadium	292.402		50	2.2	P
Zinc	206.200		20	5.7	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 10/02/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ag
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000050	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000070	0.0000000	0.0000830	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000290	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000060	0.0000000	0.0000000
Iron	271.44	0.0001300	0.0000000	0.0000000	-0.000400	0.0000000
Lead	220.35	0.0008600	0.0000000	0.0000920	-0.000008	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	294.92	0.0000000	0.0000000	0.0006580	0.0000180	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000260	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.29	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000100	0.0000000	-0.0001300	-0.000010	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.55	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	-0.0000090	0.0000000	-0.0004350	0.0000000	0.0000000
Titanium	334.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	-0.0003250	0.0000000	0.0000000
Zinc	213.85	0.0000000	0.0000000	0.0000800	0.0000390	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 10/02/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.22	0.0026340	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0002400	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000840
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000610
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0840960
Lead	220.35	0.0000000	0.0000000	0.0000000	0.0000000	-0.0026440
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	294.92	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0022990
Phosphorus	178.29	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.55	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0000000	0.0018110
Titanium	334.94	0.0000000	0.0000000	0.0000000	0.0000000	-0.0002200
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.85	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 10/02/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Cr	Cu	Mn	Na	Ni
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0087280	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	-0.0088830	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0001070
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	-0.0000530	-0.0000340	0.0000000	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	294.92	-0.0015990	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0004700	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.29	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	-0.0000990	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.55	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0002810	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.94	0.0002200	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	-0.0020840	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.85	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 10/02/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Pb	Sb	Se	Si	Tl
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0000000	-0.0001650	0.0000000	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	294.92	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0005120
Phosphorus	178.29	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000650
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.55	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.94	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.85	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 10/02/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.22	-0.0084630	0.0000000			
Antimony	206.84	-0.0060220	0.0000000			
Arsenic	189.04	0.0000000	0.0000000			
Barium	493.41	0.0000000	0.0000000			
Beryllium	313.04	0.0009440	0.0000000			
Cadmium	226.50	0.0000000	0.0000000			
Calcium	317.93	0.0000000	0.0000000			
Chromium	267.72	-0.0001950	0.0000000			
Cobalt	228.61	0.0000000	0.0000000			
Copper	324.75	0.0000000	0.0000000			
Iron	271.44	0.0124990	0.0000000			
Lead	220.35	0.0000000	0.0000000			
Magnesium	279.08	0.0000000	0.0000000			
Manganese	294.92	0.0078880	0.0000000			
Molybdenum	202.03	-0.0000010	0.0000000			
Nickel	231.60	0.0000000	0.0000000			
Phosphorus	178.29	0.0000000	0.0000000			
Potassium	766.49	0.0000000	0.0000000			
Selenium	196.03	0.0000920	0.0000000			
Silver	328.07	0.0000910	0.0000000			
Sodium	330.23	0.0000000	0.0593250			
Strontium	421.55	0.0000000	0.0000000			
Thallium	190.86	-0.0011100	0.0000000			
Titanium	334.94	0.0000000	0.0000000			
Vanadium	292.40	0.0000000	0.0000000			
Zinc	213.85	-0.0000350	0.0000000			

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Iron	10.00	1000000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments: _____

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 5 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Iron	10.00	1000000.0	P
Magnesium	10.00	600000.0	P

Comments: _____

USEPA-CLP FORMS

12

ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCS002-SPLP

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	100000.0	P
Lead	10.00	50000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	50000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	10000.0	P

Comments:

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
CAPMWPSUS20(4.0)SPLP	07/28/03	1.0	100.0
CAPMWPSUS21(2.5)SPLP	07/28/03	1.0	100.0
CAPMWPSUS39(2.0)SPLP	07/28/03	1.0	100.0
GRANBGSSS34(0.5)SPLP	07/28/03	1.0	100.0
GRANBGSSS35(0.5)SPLP	07/28/03	1.0	100.0
GRANBGSSS36(0.5)SPLP	07/28/03	1.0	100.0
LCSW0728B	07/28/03	100.0	100.0
PBW0728B	07/28/03	100.0	100.0
SHERWPSUS23(3.5)SPLP	07/28/03	1.0	100.0

USEPA-CLP FORMS

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXWPSUS08(1.2)SPLP	08/09/03	1.0	100.0
AJAXWPSUS09(1.0)SPLP	08/09/03	1.0	100.0
AJAXWPSUS10(2.0)SPLP	08/09/03	1.0	100.0
EBLKN9	08/08/03	1.0	100.0
EBLKP8	08/08/03	1.0	100.0
LCSW0809A	08/09/03	100.0	100.0
LUCABGSSS19(0.5)SPLP	08/09/03	1.0	100.0
MAGNTASSS15(0.5)SPLP	08/09/03	1.0	100.0
MAGNTASSS150.5100SPL	08/09/03	1.0	100.0
MAGNWPSSS16(0.5)SPLP	08/09/03	1.0	100.0
MAGNWPSUS14(3.0)SPLP	08/09/03	1.0	100.0
MAGNWPSUS143.0SPLPD	08/09/03	1.0	100.0
MAGNWPSUS143.0SPLPS	08/09/03	1.0	100.0
MAGNWPSUS17(2.0)SPLP	08/09/03	1.0	100.0
PBW0809A	08/09/03	100.0	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
CAPMWPSUS20(4.0)SPLP	07/31/03	100.0	100.0
CAPMWPSUS21(2.5)SPLP	07/31/03	100.0	100.0
CAPMWPSUS39(2.0)SPLP	07/31/03	100.0	100.0
GRANBGSSS34(0.5)SPLP	07/31/03	100.0	100.0
GRANBGSSS35(0.5)SPLP	07/31/03	100.0	100.0
GRANBGSSS36(0.5)SPLP	07/31/03	100.0	100.0
LCSW0731D	07/31/03	100.0	100.0
PBW0731D	07/31/03	100.0	100.0
SHERWPSUS23(3.5)SPLP	07/31/03	100.0	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXWPSUS08(1.2)SPLP	08/07/03	100.0	100.0
AJAXWPSUS09(1.0)SPLP	08/07/03	100.0	100.0
AJAXWPSUS10(2.0)SPLP	08/07/03	100.0	100.0
EBLKN9	08/07/03	100.0	100.0
EBLKP8	08/07/03	100.0	100.0
LCSDW0807H	08/07/03	100.0	100.0
LCSW0807H	08/07/03	100.0	100.0
LUCABGSSS19(0.5)SPLP	08/07/03	100.0	100.0
MAGNTASSS15(0.5)SPLP	08/07/03	100.0	100.0
MAGNTASSS150.5100SPL	08/07/03	100.0	100.0
MAGNWPSSS16(0.5)SPLP	08/07/03	100.0	100.0
MAGNWPSUS14(3.0)SPLP	08/07/03	100.0	100.0
MAGNWPSUS143.0SPLPD	08/07/03	100.0	100.0
MAGNWPSUS143.0SPLPS	08/07/03	100.0	100.0
MAGNWPSUS17(2.0)SPLP	08/07/03	100.0	100.0
PBW0807H	08/07/03	100.0	100.0

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
SO	1.00	2017																												
S	1.00	2021																												
S	1.00	2024													X															
S	1.00	2028																												
LRS	1.00	2033													X															
LRS	1.00	2037													X															
LRS	1.00	2041													X															
ICV	1.00	2045													X															
ICB	1.00	2049													X															
ICSA	1.00	2053													X															
ICSAB	1.00	2058													X															
CRI	1.00	2102													X															
CCV	1.00	2106													X															
CCB	1.00	2110													X															
ZZZZZZ	1.00	2114																												
ZZZZZZ	1.00	2118																												
ZZZZZZ	1.00	2122																												
ZZZZZZ	5.00	2126																												
ZZZZZZ	1.00	2130																												
ZZZZZZ	1.00	2134																												
ZZZZZZ	1.00	2138																												
ZZZZZZ	1.00	2143																												
ZZZZZZ	1.00	2147																												
ZZZZZZ	1.00	2151																												
CCV	1.00	2155													X															
CCB	1.00	2159													X															
ZZZZZZ	1.00	2203																												
ZZZZZZ	1.00	2207																												
ZZZZZZ	1.00	2211																												
ZZZZZZ	1.00	2215																												
ZZZZZZ	5.00	2219																												
ZZZZZZ	1.00	2223																												
ZZZZZZ	1.00	2227																												
ZZZZZZ	1.00	2231																												
EBLKN9	1.00	2235													X															
CCV	1.00	2239													X															
CCB	1.00	2244													X															
ICSA	1.00	2248													X															

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
ICSAB	1.00	2252													X															
CRI	1.00	2256													X															
CCV	1.00	2300													X															
CCB	1.00	2304													X															

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/28/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0213		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
S	1.00	0217		X						X										X			X							
S	1.00	0220			X	X									X						X			X						
S	1.00	0224					X	X	X		X	X	X				X		X			X			X	X				
LRS	1.00	0229		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LRS	1.00	0233		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LRS	1.00	0237		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
ICV	1.00	0241		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
ICB	1.00	0245		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
ICSA	1.00	0249		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
ICSAB	1.00	0254		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CRI	1.00	0258		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCV	1.00	0302		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCB	1.00	0306		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
PBW0731D	1.00	0310		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LCSW0731D	1.00	0314		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
SHERWPSUS23(3.5)SPLP	1.00	0318		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
SHERWPSUS23(3.5)SPLP	5.00	0322		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
ZZZZZZ	1.00	0326																												
CAPMWPSUS20(4.0)SPLP	1.00	0331		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CAPMWPSUS21(2.5)SPLP	1.00	0335		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CAPMWPSUS39(2.0)SPLP	1.00	0339		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
GRANBGSSS34(0.5)SPLP	1.00	0343		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
GRANBGSSS35(0.5)SPLP	1.00	0347		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCV	1.00	0351		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCB	1.00	0355		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
GRANBGSSS36(0.5)SPLP	1.00	0359		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
PBW0807H	1.00	0403		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LCSW0807H	1.00	0407		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LCSDW0807H	1.00	0412		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
AJAXWPSUS08(1.2)SPLP	1.00	0416		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
AJAXWPSUS09(1.0)SPLP	1.00	0420		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
MAGNTASSS15(0.5)SPLP	1.00	0424		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
MAGNTASSS150.5100SPL	1.00	0428		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
LUCABGSSS19(0.5)SPLP	1.00	0432		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
MAGNWPSSS16(0.5)SPLP	1.00	0436		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCV	1.00	0440		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				
CCB	1.00	0444		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X				

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/28/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																												
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN					
AJAXWPSUS10(2.0)SPLP	1.00	0448		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
MAGNWPSUS14(3.0)SPLP	1.00	0453		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
MAGNWPSUS14(3.0)SPLP	5.00	0457		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
MAGNWPSUS14(3.0)SPLP	1.00	0501		X	X	X	X	X	X		X	X	X		X		X		X		X	X		X	X	X					
MAGNWPSUS143.0SPLPD	1.00	0505		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
MAGNWPSUS143.0SPLPS	1.00	0509				X	X		X		X		X		X				X		X	X				X					
MAGNWPSUS17(2.0)SPLP	1.00	0513		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
EBLKP8	1.00	0517		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
CCV	1.00	0521		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
CCB	1.00	0525		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
ICSA	1.00	0529		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
ICSAB	1.00	0534		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
CRI	1.00	0538		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
CCV	1.00	0542		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					
CCB	1.00	0546		X	X	X	X	X	X	X	X	X	X		X		X		X	X	X	X	X	X	X	X					

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 5 Method: P

Start Date: 08/28/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1042	..											X		X											
S	1.00	1049												X		X											
S	1.00	1054																									
S	1.00	1058																									
LRS	1.00	1105												X		X											
LRS	1.00	1111												X		X											
LRS	1.00	1117												X		X											
ICV	1.00	1124												X		X											
ICB	1.00	1130												X		X											
ICSA	1.00	1136												X		X											
ICSAB	1.00	1143												X		X											
CRI	1.00	1149												X		X											
CCV	1.00	1155												X		X											
CCB	1.00	1202												X		X											
PBW0731D	1.00	1208												X		X											
LCSW0731D	1.00	1214												X		X											
SHERWPSUS23(3.5)SPLP	1.00	1220												X		X											
SHERWPSUS23(3.5)SPLP	5.00	1227												X		X											
ZZZZZZ	1.00	1233																									
CAPMWPSUS20(4.0)SPLP	1.00	1239												X		X											
CAPMWPSUS21(2.5)SPLP	1.00	1246												X		X											
CAPMWPSUS39(2.0)SPLP	1.00	1252												X		X											
GRANBGSSS34(0.5)SPLP	1.00	1258												X		X											
GRANBGSSS35(0.5)SPLP	1.00	1304												X		X											
CCV	1.00	1311												X		X											
CCB	1.00	1317												X		X											
GRANBGSSS36(0.5)SPLP	1.00	1323												X		X											
PBW0807H	1.00	1329												X		X											
LCSW0807H	1.00	1336												X		X											
LCSDW0807H	1.00	1342												X		X											
AJAXWPSUS08(1.2)SPLP	1.00	1348												X		X											
AJAXWPSUS09(1.0)SPLP	1.00	1355												X		X											
MAGNTASSS15(0.5)SPLP	1.00	1401												X		X											
MAGNTASSS150.5100SPL	1.00	1407												X		X											
LUCABGSSS19(0.5)SPLP	1.00	1413												X		X											
MAGNWPSSS16(0.5)SPLP	1.00	1419												X		X											
CCV	1.00	1426												X		X											
CCB	1.00	1432												X		X											

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 5 Method: P

Start Date: 08/28/03 End Date: 08/28/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
AJAXWPSUS10(2.0)SPLP	1.00	1438												X		X												
MAGNWPSUS14(3.0)SPLP	1.00	1444												X		X												
MAGNWPSUS14(3.0)SPLP	5.00	1451												X		X												
MAGNWPSUS14(3.0)SPLP	1.00	1457												X														
MAGNWPSUS143.0SPLPD	1.00	1503												X		X												
MAGNWPSUS143.0SPLPS	1.00	1509																										
MAGNWPSUS17(2.0)SPLP	1.00	1516												X		X												
EBLKP8	1.00	1522												X		X												
CCV	1.00	1528												X		X												
CCB	1.00	1534												X		X												
ICSA	1.00	1541												X		X												
ICSAB	1.00	1547												X		X												
CRI	1.00	1553												X		X												
CCV	1.00	1600												X		X												
CCB	1.00	1606												X		X												

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/21/03 End Date: 09/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	1458		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
S	1.00	1503		X						X				X		X				X			X						
S	1.00	1506			X	X															X			X					
S	1.00	1510					X	X	X		X	X	X				X		X			X			X	X			
LRS	1.00	1515		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
LRS	1.00	1520		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
LRS	1.00	1525		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ICV	1.00	1529		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ICB	1.00	1534		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ICSA	1.00	1539		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ICSAB	1.00	1543		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
CRI	1.00	1548		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
CCV	1.00	1553		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
CCB	1.00	1558		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
EBLKN9	1.00	1602		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	1.00	1607																												
ZZZZZZ	1.00	1612																												
ZZZZZZ	10.00	1616																												
ZZZZZZ	10.00	1621																												
ZZZZZZ	10.00	1625																												
ZZZZZZ	10.00	1630																												
ZZZZZZ	10.00	1635																												
ZZZZZZ	10.00	1639																												
ZZZZZZ	10.00	1644																												
CCV	1.00	1649		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
CCB	1.00	1653		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
ZZZZZZ	10.00	1658																												
ZZZZZZ	10.00	1703																												
ZZZZZZ	10.00	1707																												
ZZZZZZ	10.00	1712																												
ZZZZZZ	10.00	1717																												
ZZZZZZ	10.00	1721																												
ZZZZZZ	10.00	1726																												
ZZZZZZ	10.00	1730																												
ZZZZZZ	10.00	1735																												
ZZZZZZ	10.00	1740																												
CCV	1.00	1744		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
CCB	1.00	1749		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/21/03 End Date: 09/21/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	
ZZZZZZ	10.00	1754												..														
ZZZZZZ	50.00	1758																										
ZZZZZZ	10.00	1803																										
ZZZZZZ	10.00	1808																										
ZZZZZZ	10.00	1812																										
ZZZZZZ	10.00	1817																										
ZZZZZZ	50.00	1822																										
ZZZZZZ	10.00	1826																										
ZZZZZZ	10.00	1831																										
CCV	1.00	1835		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCB	1.00	1840		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
ICSA	1.00	1845		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
ICSAB	1.00	1850		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CRI	1.00	1854		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCV	1.00	1859		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCB	1.00	1904		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/01/03 End Date: 08/01/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0942																X									
S0	1.00	0946																X									
S0.2	1.00	0948																X									
S0.5	1.00	0949																X									
S1	1.00	0951																X									
S5	1.00	0954																X									
S10	1.00	0955																X									
ICV	1.00	0957																X									
ICB	1.00	0959																X									
CRA	1.00	1001																X									
CCV	1.00	1002																X									
CCB	1.00	1004																X									
PBW0728B	1.00	1006																X									
LCSW0728B	1.00	1008																X									
ZZZZZZ	1.00	1009																									
ZZZZZZ	1.00	1012																									
SHERWPSUS23(3.5)SPLP	1.00	1013																X									
CAPMWPSUS20(4.0)SPLP	1.00	1015																X									
CAPMWPSUS21(2.5)SPLP	1.00	1017																X									
CAPMWPSUS39(2.0)SPLP	1.00	1019																X									
GRANBGSSS34(0.5)SPLP	1.00	1021																X									
CCV	1.00	1022																X									
CCB	1.00	1024																X									
GRANBGSSS35(0.5)SPLP	1.00	1026																X									
GRANBGSSS36(0.5)SPLP	1.00	1028																X									
ZZZZZZ	1.00	1030																									
ZZZZZZ	1.00	1031																									
ZZZZZZ	1.00	1033																									
ZZZZZZ	1.00	1035																									
ZZZZZZ	1.00	1037																									
ZZZZZZ	1.00	1039																									
ZZZZZZ	1.00	1040																									
CCV	1.00	1043																X									
CCB	1.00	1045																X									

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/10/03 End Date: 08/10/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	0600																X				..					
S0.2	1.00	0602																X									
S0.5	1.00	0604																X									
S1	1.00	0606																X									
S5	1.00	0608																X									
S10	1.00	0609																X									
ICV	1.00	0611																X									
ICB	1.00	0613																X									
CRA	1.00	0615																X									
CCV	1.00	0616																X									
CCB	1.00	0618																X									
PBW0809A	1.00	0620																X									
LCSW0809A	1.00	0622																X									
ZZZZZZ	1.00	0623																									
ZZZZZZ	1.00	0625																									
ZZZZZZ	1.00	0627																									
ZZZZZZ	1.00	0629																									
ZZZZZZ	1.00	0631																									
ZZZZZZ	1.00	0633																									
AJAXWPSUS08(1.2)SPLP	1.00	0635																X									
CCV	1.00	0637																X									
CCB	1.00	0639																X									
AJAXWPSUS09(1.0)SPLP	1.00	0641																X									
MAGNTASSS15(0.5)SPLP	1.00	0643																X									
MAGNTASSS150.5100SPL	1.00	0645																X									
LUCABGSSS19(0.5)SPLP	1.00	0647																X									
MAGNWPSSS16(0.5)SPLP	1.00	0649																X									
AJAXWPSUS10(2.0)SPLP	1.00	0650																X									
MAGNWPSUS14(3.0)SPLP	1.00	0652																X									
MAGNWPSUS143.0SPLPS	1.00	0654																X									
MAGNWPSUS143.0SPLPD	1.00	0656																X									
CCV	1.00	0658																X									
CCB	1.00	0700																X									
MAGNWPSUS17(2.0)SPLP	1.00	0702																X									
ZZZZZZ	1.00	0704																									
ZZZZZZ	1.00	0706																									
ZZZZZZ	1.00	0708																									
ZZZZZZ	1.00	0710																									

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCS002-SPLP

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/10/03 End Date: 08/10/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
ZZZZZZ	1.00	0712																												
ZZZZZZ	1.00	0713																												
EBLKN9	1.00	0715																X												
EBLKP8	1.00	0717																X												
CCV	1.00	0719																X												
CCB	1.00	0721																X												

STL Burlington
Colchester, Vermont

Sample Data Summary
Package

SDG: GCV001

SEVERN TRENT STL

September 17, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCV001

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 12, 15, 18, 22 and 24, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/12/03	ETR No: 94699	
533808	MONU-WP-PLT-15	07/09/03	Solid
533809	MONU-WP-PLT-14	07/10/03	Solid
533810	EBLK		Water
	Received: 07/15/03	ETR No: 94720	
533933	CENT-WP-PLT-31	07/11/03	Solid
533934	TILL-WP-PLT-27	07/12/03	Solid
	Received: 07/18/03	ETR No: 94839	
534697	SHERWPPLT23	07/14/03	Solid
534698	SHERWPPLT23(100)	07/14/03	Solid
534699	CAPMWPPLT20	07/15/03	Solid
534700	GRANBGPLT35	07/15/03	Solid
534701	GRANBGPLT34	07/15/03	Solid
534702	GRANBGPLT36	07/15/03	Solid
534702MS	GRANBGPLT36MS	07/15/03	Solid
534702DP	GRANBGPLT36REP	07/15/03	Solid

0001-A

Severn Trent Laboratories, Inc.
STL Burlington • 208 South Park Drive, Suite 1, Colchester, VT 05446
Tel 802 655 1203 Fax 802 655 1248 • *www.stl-inc.com*

A part of Severn Trent plc

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94942		
535357	AJAXWPPLT08	07/17/03	Solid
535358	AJAXPDPLT06	07/17/03	Solid
535359	MAGNWPPLT14	07/18/03	Solid
535360	MAGNPDPLT11	07/18/03	Solid
535361	LUCABGPLT19	07/19/03	Solid
535362	MAGNWPPLT17	07/19/03	Solid
	Received: 07/24/03 ETR No: 94998		
535819	BLUEWPPLT20	07/21/03	Solid
535820	BLUEWPPLT24	07/21/03	Solid
535859	EBLK		Water

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal.

The plant samples were homogenized for analysis by the lab and after homogenization the tissue was maintained in frozen storage at -20 °C.

The results for the tissue samples are reported on a dry weight basis. In preparing the tissues, an equipment bank was generated in order to characterize the homogenization process. This blank, identified as "EBLK", was carried through each of the analytical processes, using weighed amounts similar to the tissue amounts that were analyzed. The results have been reported on the same weight/weight basis as the tissue samples.

Metals by ICP / CVAA

The percent differences between the original determination and the serial dilution determination for potassium and zinc in sample GRANBGPLT36 were 24.0 and 19.8 percent, respectively. These recoveries are above the control criteria of ±10 percent. Matrix interference is suspected and results have been flagged with an "E" accordingly.

The recovery of cyanide from the laboratory fortified aliquot of sample GRANBGPLT36 was 47.5 percent which is below the control limit of 75-100 percent. Corresponding sample results

have been qualified with an "N" to denote this anomaly. Recovery from the post digestate spike proved acceptable as did recovery from the laboratory control sample.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0532.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

0001-C Last Alpha

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: same
Address: 12011 Bel-Red Rd Suite 200 Bellevue, WA 98005	Address:
Contact: Jen Kindred	Contact:
Phone: 425-451-7400	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: ~~James Gatherer~~ Don Norman

Sampler's Signature: Don Norman

Proj. No.: 13890.13.16

Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TAL metals	Cyanide	Lab/Sample ID (Lab Use Only)
V	7/9/03	1700		X	monu-WP-PLT-15				1	X	X	
V	7/10/03	1100		X	monu-WP-PLT-14				1	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature)	Date	Time
[illegible]	7-11-03	0800	[illegible]	07.12.03	1100
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other ziplock bag

1 veg V = Vegetation Tissue

STL cannot accept verbal changes.
Please Fax written changes to
(802) 655-1248

STL8234-200 (12/02)

1 of 1

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200
Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7480
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Dan Norman
Sampler's Signature: Dan Norman

Proj. No.: 13890.13
Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	ANALYSIS REQUESTED: TAL Metals	Cyanide	Lab/Sample ID (Lab Use Only)
V	7/11/03	1030		X	Cent-WP-PLT-31				1	X	X	
V	7/12/03	1400		X	TILL-WP-PLT-27				1	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time	Remarks
	7/14/03	0700		7/15/03	1020	
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time	
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time	Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other 2 plock bag
V = Vegetation Tissue

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
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Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Don Norman
Sampler's Signature: Don Norman

Proj. No.: 13890.13
Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	TAL metals	Cyanide	Lab/Sample ID (Lab Use Only)
V	7/14/03	1340		X	SHER-WP-PLT-23				1	X	X	
V	7/14/03	1340		X	SHER-WP-PLT-23(100)				1	X	X	
V	7/15/03	1130		X	CAPM-WP-PLT-20				1	X	X	
V	7/15/03	1625		X	GRAN-BG-PLT-35				1	X	X	
V	7/15/03	1600		X	GRAN-BG-PLT-34				1	X	X	
V	7/15/03	1800		X	GRAN-BG-PLT-36 MS				2	X	X	MS

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
	7/16/03	1500		7/16/03	1000
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other Ziplock bag
V = vegetation tissue

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**

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STL Burlington
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p 1 of 1

CHAIN OF CUSTODY RECORD

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Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Don Norman
Sampler's Signature: Don Norman

Proj. No.: 13890.13
Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2]: VOA	A/G 1 Lt.	250 ml	P/O	ANALYSIS REQUESTED: TAL Metals	CN	Lab/Sample ID (Lab Use Only)
V	7/17/03	1320		X	AJAX-WP-PLT-08				1	X	X	
V	7/17/03	1300		X	AJAX-PD-PLT-06				1	X	X	
V	7/18/03	1700		X	MAGN-WP-PLT-14				1	X	X	
V	7/16/03	1430		X	MAGN-PD-PLT-11				1	X	X	
V	7/19/03	1400		X	LUCA-BG-PLT-19				1	X	X	
V	7/19/03	1245		X	MAGN-WP-PLT-17				1	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
[signature]	7-21-03	0900	[signature]	7/22/03	1030
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other Ziplock bag
V = Vegetation Tissue

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(802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

1 of 1

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200 Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7400
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Don Norman
Sampler's Signature: Don Norman

Proj. No.: 13890.16
Project Name: Granite Cr. Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	ANALYSIS REQUESTED: TAL Metals	CN	Lab/Sample ID (Lab Use Only)
V	7/21/03	1330		X	BLUE-WP-PLT-20				1	X	X	
V	7/24/03	1300		X	BLUE-WP-PLT-24				1	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
[signature]	7/23/03	0900	[signature]	7/24/03	0930
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other Ziplock bag
V = Vegetation tissue

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MONU-WP-PLT-15

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 533808

Matrix: SOLID | Client: EASEAT | Date Received: 07/12/03

% Solids: 35.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/15/03	N/A	%	1.0		35.2	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MONU-WP-PLT-14

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 533809

Matrix: SOLID
Client: EASEAT
Date Received: 07/12/03

% Solids: 31.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/15/03	N/A	%	1.0		31.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
EBLK

Lab Name: STL BURLINGTON **Contract:** **SDG No.:** GCV001

Lab Code: STLVT **Case No.:** 23046 **Lab Sample ID:** 533810

Matrix: WATER **Client:** EASEAT **Date Received:** 07/12/03

% Solids: 0.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/15/03	N/A	%	1.0		0.0	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
CENT-WP-PLT-31

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 533933

Matrix: SOLID | Client: EASEAT | Date Received: 07/15/03

% Solids: 33.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		33.1	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
TILL-WP-PLT-27

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 533934

Matrix: SOLID
Client: EASEAT
Date Received: 07/15/03

% Solids: 36.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	08/05/03	N/A	%	1.0		36.1	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
SHERWPPLT23

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534697

Matrix: SOLID | Client: EASEAT | Date Received: 07/18/03

% Solids: 31.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		31.0	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
SHERWPPLT23(100)

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534698

Matrix: SOLID
Client: EASEAT
Date Received: 07/18/03

% Solids: 30.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		30.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
CAPMWPPLT20

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534699

Matrix: SOLID | Client: EASEAT | Date Received: 07/18/03

% Solids: 31.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		31.9	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANBGPLT35

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534700

Matrix: SOLID
Client: EASEAT
Date Received: 07/18/03

% Solids: 29.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		29.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANBGPLT34

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 534701

Matrix: SOLID | Client: EASEAT | Date Received: 07/18/03

% Solids: 32.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		32.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANBGPLT36

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534702

Matrix: SOLID
Client: EASEAT
Date Received: 07/18/03

% Solids: 35.6

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/31/03	N/A	%	1.0		35.6	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.
GRANBGPLT36REP

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 534702DP

Matrix: SOLID
Client: EASEAT
Date Received: 07/18/03

% Solids: 36.3

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Sample Result Qual.	Duplicate Sample Result Conc.	Duplicate Sample Result Qual.	RPD*
IN623	Solids, Percent	07/31/03	N/A	%	35.6		36.3		2

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXWPPLT08

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535357

Matrix: SOLID | Client: EASEAT | Date Received: 07/22/03

% Solids: 34.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		34.2	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXPDPLT06

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535358

Matrix: SOLID
Client: EASEAT
Date Received: 07/22/03

% Solids: 31.1

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		31.1	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNWPPLT14

Lab Name: STL BURLINGTON
Contract:
SDG No.: GCV001

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535359

Matrix: SOLID
Client: EASEAT
Date Received: 07/22/03

% Solids: 34.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		34.9	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNPDPLT11

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535360

Matrix: SOLID | Client: EASEAT | Date Received: 07/22/03

% Solids: 32.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		32.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
LUCABGPLT19

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535361

Matrix: SOLID | Client: EASEAT | Date Received: 07/22/03

% Solids: 32.5

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		32.5	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNWPPLT17

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535362

Matrix: SOLID | Client: EASEAT | Date Received: 07/22/03

% Solids: 34.2

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		34.2	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUEWPPLT20

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535819

Matrix: SOLID | Client: EASEAT | Date Received: 07/24/03

% Solids: 39.9

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		39.9	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUEWPPLT24

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535820

Matrix: SOLID | Client: EASEAT | Date Received: 07/24/03

% Solids: 29.8

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		29.8	

Printed on: 09/10/03 11:37 AM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
EBLK

Lab Name: STL BURLINGTON | Contract: | SDG No.: GCV001

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535859

Matrix: WATER | Client: EASEAT | Date Received: 07/24/03

% Solids: 0.0

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
IN623	Solids, Percent	07/29/03	N/A	%	1.0		0.0	

Printed on: 09/10/03 11:37 AM

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Sample Data Summary Package For Metals

USEPA-CLP FORMS

COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
AJAXPDPLT06	535358
AJAXWPPLT08	535357
BLUEWPPLT20	535819
BLUEWPPLT24	535820
CAPMWPPLT20	534699
CENT-WP-PLT-31	533933
EBLK1	533810
EBLK2	535859
GRANBGPLT34	534701
GRANBGPLT35	534700
GRANBGPLT36	534702
GRANBGPLT36D	534702DP
GRANBGPLT36S	534702MS
LUCABGPLT19	535361
MAGNPDPLT11	535360
MAGNWPPLT14	535359
MAGNWPPLT17	535362
MONU-WP-PLT-14	533809
MONU-WP-PLT-15	533808
SHERWPPLT23	534697
SHERWPPLT23(100)	534698
TILL-WP-PLT-27	533934

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES

If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

USEPA-CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXPDPLT06

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535358

Level (low/med): LOW Date Received: 07/22/03

% Solids: 31.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	161			P
7440-36-0	Antimony	1.4	U		P
7440-38-2	Arsenic	4.1			P
7440-39-3	Barium	34.2	B		P
7440-41-7	Beryllium	0.088	B		P
7440-43-9	Cadmium	0.18	U		P
7440-70-2	Calcium	14800			P
7440-47-3	Chromium	0.41	U		P
7440-48-4	Cobalt	0.61	B		P
7440-50-8	Copper	5.6	B		P
7439-89-6	Iron	718			P
7439-92-1	Lead	1.7			P
7439-95-4	Magnesium	6560			P
7439-96-5	Manganese	208			P
7439-97-6	Mercury	0.058	B		CV
7440-02-0	Nickel	0.62	U		P
7440-09-7	Potassium	16200		E	P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	0.65	U		P
7440-23-5	Sodium	595	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	1.1	B		P
7440-66-6	Zinc	20.6		E	P
57-12-5	Cyanide	1.6	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXWPPLT08

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535357

Level (low/med): LOW Date Received: 07/22/03

% Solids: 34.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	218			P
7440-36-0	Antimony	1.4	U		P
7440-38-2	Arsenic	20.4			P
7440-39-3	Barium	37.5	B		P
7440-41-7	Beryllium	0.098	B		P
7440-43-9	Cadmium	0.17	U		P
7440-70-2	Calcium	16000			P
7440-47-3	Chromium	0.41	U		P
7440-48-4	Cobalt	0.58	U		P
7440-50-8	Copper	6.5	B		P
7439-89-6	Iron	1080			P
7439-92-1	Lead	1.2			P
7439-95-4	Magnesium	7170			P
7439-96-5	Manganese	154			P
7439-97-6	Mercury	0.048	U		CV
7440-02-0	Nickel	0.61	U		P
7440-09-7	Potassium	17300		E	P
7782-49-2	Selenium	1.6			P
7440-22-4	Silver	0.64	U		P
7440-23-5	Sodium	422	B		P
7440-28-0	Thallium	1.7	U		P
7440-62-2	Vanadium	1.2	B		P
7440-66-6	Zinc	19.5		E	P
57-12-5	Cyanide	1.3	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLUEWPPLT20

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535819

Level (low/med): LOW Date Received: 07/24/03

% Solids: 39.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	256			P
7440-36-0	Antimony	0.98	U		P
7440-38-2	Arsenic	1.0	U		P
7440-39-3	Barium	308			P
7440-41-7	Beryllium	0.080	B		P
7440-43-9	Cadmium	0.14	B		P
7440-70-2	Calcium	14300			P
7440-47-3	Chromium	0.29	U		P
7440-48-4	Cobalt	0.42	U		P
7440-50-8	Copper	4.5	B		P
7439-89-6	Iron	325			P
7439-92-1	Lead	0.31	U		P
7439-95-4	Magnesium	4320			P
7439-96-5	Manganese	195			P
7439-97-6	Mercury	0.083			CV
7440-02-0	Nickel	0.44	U		P
7440-09-7	Potassium	14000		E	P
7782-49-2	Selenium	0.99	B		P
7440-22-4	Silver	0.46	U		P
7440-23-5	Sodium	235	B		P
7440-28-0	Thallium	1.2	U		P
7440-62-2	Vanadium	0.81	B		P
7440-66-6	Zinc	17.3		E	P
57-12-5	Cyanide	1.2	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLUEWPPLT24

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535820

Level (low/med): LOW Date Received: 07/24/03

% Solids: 29.8

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	273			P
7440-36-0	Antimony	1.4	U		P
7440-38-2	Arsenic	1.5	U		P
7440-39-3	Barium	72.3			P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	0.18	U		P
7440-70-2	Calcium	13000			P
7440-47-3	Chromium	1.8	B		P
7440-48-4	Cobalt	0.62	U		P
7440-50-8	Copper	5.3	B		P
7439-89-6	Iron	431			P
7439-92-1	Lead	0.99			P
7439-95-4	Magnesium	5180			P
7439-96-5	Manganese	75.9			P
7439-97-6	Mercury	0.056	U		CV
7440-02-0	Nickel	4.4	B		P
7440-09-7	Potassium	15000		E	P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	0.68	U		P
7440-23-5	Sodium	321	B		P
7440-28-0	Thallium	1.8	U		P
7440-62-2	Vanadium	1.2	B		P
7440-66-6	Zinc	39.1		E	P
57-12-5	Cyanide	1.7	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CAPMWPPLT20

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534699

Level (low/med): LOW Date Received: 07/18/03

% Solids: 31.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	257			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.2	U		P
7440-39-3	Barium	231			P
7440-41-7	Beryllium	0.096	B		P
7440-43-9	Cadmium	0.15	U		P
7440-70-2	Calcium	12700			P
7440-47-3	Chromium	0.36	U		P
7440-48-4	Cobalt	0.51	U		P
7440-50-8	Copper	4.6	B		P
7439-89-6	Iron	262			P
7439-92-1	Lead	0.50	B		P
7439-95-4	Magnesium	4030			P
7439-96-5	Manganese	162			P
7439-97-6	Mercury	0.063	B		CV
7440-02-0	Nickel	0.54	U		P
7440-09-7	Potassium	15900		E	P
7782-49-2	Selenium	0.87	U		P
7440-22-4	Silver	0.56	U		P
7440-23-5	Sodium	289	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	0.76	B		P
7440-66-6	Zinc	16.7		E	P
57-12-5	Cyanide	1.6	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
CENT-WP-PLT-31

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 533933

Level (low/med): LOW Date Received: 07/15/03

% Solids: 33.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	251			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	1.4	U		P
7440-39-3	Barium	290			P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	0.85	B		P
7440-70-2	Calcium	17800			P
7440-47-3	Chromium	1.7	B		P
7440-48-4	Cobalt	0.57	U		P
7440-50-8	Copper	6.1	B		P
7439-89-6	Iron	409			P
7439-92-1	Lead	2.1			P
7439-95-4	Magnesium	5310			P
7439-96-5	Manganese	191			P
7439-97-6	Mercury	0.092	B		CV
7440-02-0	Nickel	0.60	U		P
7440-09-7	Potassium	15100		E	P
7782-49-2	Selenium	0.97	U		P
7440-22-4	Silver	0.63	U		P
7440-23-5	Sodium	338	B		P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	0.97	B		P
7440-66-6	Zinc	43.7		E	P
57-12-5	Cyanide	1.6	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
EBLK1

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 533810

Level (low/med): LOW Date Received: 07/12/03

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2.4	U		P
7440-36-0	Antimony	0.47	U		P
7440-38-2	Arsenic	0.48	U		P
7440-39-3	Barium	0.59	U		P
7440-41-7	Beryllium	0.044	B		P
7440-43-9	Cadmium	0.060	U		P
7440-70-2	Calcium	18.2	U		P
7440-47-3	Chromium	0.14	U		P
7440-48-4	Cobalt	0.20	U		P
7440-50-8	Copper	0.24	U		P
7439-89-6	Iron	3.3	U		P
7439-92-1	Lead	0.19	B		P
7439-95-4	Magnesium	17.8	U		P
7439-96-5	Manganese	0.070	U		P
7439-97-6	Mercury	0.017	U		CV
7440-02-0	Nickel	0.21	U		P
7440-09-7	Potassium	39.3	U	E	P
7782-49-2	Selenium	0.34	U		P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	124	B		P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	0.20	U		P
7440-66-6	Zinc	0.21	B	E	P

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
EBLK2

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535859

Level (low/med): LOW Date Received: 07/24/03

% Solids: 100.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	2.4	U		P
7440-36-0	Antimony	0.47	U		P
7440-38-2	Arsenic	0.48	U		P
7440-39-3	Barium	0.59	U		P
7440-41-7	Beryllium	0.045	B		P
7440-43-9	Cadmium	0.060	U		P
7440-70-2	Calcium	18.2	U		P
7440-47-3	Chromium	0.14	U		P
7440-48-4	Cobalt	0.20	U		P
7440-50-8	Copper	0.24	U		P
7439-89-6	Iron	3.3	U		P
7439-92-1	Lead	0.38			P
7439-95-4	Magnesium	17.8	U		P
7439-96-5	Manganese	0.070	U		P
7439-97-6	Mercury	0.016	U		CV
7440-02-0	Nickel	0.21	U		P
7440-09-7	Potassium	39.3	U	E	P
7782-49-2	Selenium	0.34	U		P
7440-22-4	Silver	0.22	U		P
7440-23-5	Sodium	115	B		P
7440-28-0	Thallium	0.57	U		P
7440-62-2	Vanadium	0.20	U		P
7440-66-6	Zinc	0.12	B	E	P
57-12-5	Cyanide	0.49	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANBGPLT34

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534701

Level (low/med): LOW Date Received: 07/18/03

% Solids: 32.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	143			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.2	U		P
7440-39-3	Barium	341			P
7440-41-7	Beryllium	0.071	B		P
7440-43-9	Cadmium	0.37	B		P
7440-70-2	Calcium	13300			P
7440-47-3	Chromium	0.36	U		P
7440-48-4	Cobalt	0.51	U		P
7440-50-8	Copper	4.3	B		P
7439-89-6	Iron	181			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	4280			P
7439-96-5	Manganese	262			P
7439-97-6	Mercury	0.045	U		CV
7440-02-0	Nickel	0.53	U		P
7440-09-7	Potassium	16800		E	P
7782-49-2	Selenium	0.86	U		P
7440-22-4	Silver	0.56	U		P
7440-23-5	Sodium	311	B		P
7440-28-0	Thallium	1.4	U		P
7440-62-2	Vanadium	0.51	U		P
7440-66-6	Zinc	18.1		E	P
57-12-5	Cyanide	1.4	U	N	AS

Color Before: green Clarity Before: _____ Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGPLT35

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534700

Level (low/med): LOW Date Received: 07/18/03

% Solids: 29.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	312			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	1.3	U		P
7440-39-3	Barium	368			P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.16	U		P
7440-70-2	Calcium	10400			P
7440-47-3	Chromium	0.37	U		P
7440-48-4	Cobalt	0.53	U		P
7440-50-8	Copper	4.6	B		P
7439-89-6	Iron	315			P
7439-92-1	Lead	0.91			P
7439-95-4	Magnesium	4290			P
7439-96-5	Manganese	202			P
7439-97-6	Mercury	0.052	U		CV
7440-02-0	Nickel	0.56	U		P
7440-09-7	Potassium	19600		E	P
7782-49-2	Selenium	1.2	B		P
7440-22-4	Silver	0.59	U		P
7440-23-5	Sodium	340	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	0.94	B		P
7440-66-6	Zinc	14.2		E	P
57-12-5	Cyanide	1.6	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
GRANBGPLT36

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534702

Level (low/med): LOW Date Received: 07/18/03

% Solids: 35.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	213			P
7440-36-0	Antimony	1.0	U		P
7440-38-2	Arsenic	1.1	U		P
7440-39-3	Barium	505			P
7440-41-7	Beryllium	0.054	B		P
7440-43-9	Cadmium	0.13	U		P
7440-70-2	Calcium	17300			P
7440-47-3	Chromium	0.31	U		P
7440-48-4	Cobalt	0.44	U		P
7440-50-8	Copper	4.8	B		P
7439-89-6	Iron	247			P
7439-92-1	Lead	0.38	B		P
7439-95-4	Magnesium	4570			P
7439-96-5	Manganese	324			P
7439-97-6	Mercury	0.045	U		CV
7440-02-0	Nickel	0.46	U		P
7440-09-7	Potassium	16200		E	P
7782-49-2	Selenium	0.95	B		P
7440-22-4	Silver	0.49	U		P
7440-23-5	Sodium	285	B		P
7440-28-0	Thallium	1.3	U		P
7440-62-2	Vanadium	0.60	B		P
7440-66-6	Zinc	13.4		E	P
57-12-5	Cyanide	1.4	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
LUCABGPLT19

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535361

Level (low/med): LOW Date Received: 07/22/03

% Solids: 32.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	72.7			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.3	U		P
7440-39-3	Barium	252			P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.16	U		P
7440-70-2	Calcium	12400			P
7440-47-3	Chromium	0.37	U		P
7440-48-4	Cobalt	0.52	U		P
7440-50-8	Copper	5.7	B		P
7439-89-6	Iron	132			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	4330			P
7439-96-5	Manganese	238			P
7439-97-6	Mercury	0.051	U		CV
7440-02-0	Nickel	0.55	U		P
7440-09-7	Potassium	16500		E	P
7782-49-2	Selenium	1.4			P
7440-22-4	Silver	0.57	U		P
7440-23-5	Sodium	330	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	0.52	U		P
7440-66-6	Zinc	21.4		E	P
57-12-5	Cyanide	1.5	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNPDPLT11

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535360

Level (low/med): LOW Date Received: 07/22/03

% Solids: 32.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	290			P
7440-36-0	Antimony	1.4	U		P
7440-38-2	Arsenic	8.1			P
7440-39-3	Barium	86.7			P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.18	U		P
7440-70-2	Calcium	14000			P
7440-47-3	Chromium	0.43	U		P
7440-48-4	Cobalt	0.62	U		P
7440-50-8	Copper	5.8	B		P
7439-89-6	Iron	679			P
7439-92-1	Lead	1.7			P
7439-95-4	Magnesium	5200			P
7439-96-5	Manganese	95.3			P
7439-97-6	Mercury	0.064	B		CV
7440-02-0	Nickel	0.65	U		P
7440-09-7	Potassium	16200		E	P
7782-49-2	Selenium	1.0	U		P
7440-22-4	Silver	0.68	U		P
7440-23-5	Sodium	342	B		P
7440-28-0	Thallium	1.8	U		P
7440-62-2	Vanadium	1.3	B		P
7440-66-6	Zinc	27.0		E	P
57-12-5	Cyanide	1.5	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPPLT14

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535359

Level (low/med): LOW Date Received: 07/22/03

% Solids: 34.9

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	157			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	3.0			P
7440-39-3	Barium	123			P
7440-41-7	Beryllium	0.12	B		P
7440-43-9	Cadmium	0.17	U		P
7440-70-2	Calcium	15200			P
7440-47-3	Chromium	0.39	U		P
7440-48-4	Cobalt	0.55	U		P
7440-50-8	Copper	6.8	B		P
7439-89-6	Iron	338			P
7439-92-1	Lead	0.91			P
7439-95-4	Magnesium	6130			P
7439-96-5	Manganese	113			P
7439-97-6	Mercury	0.047	U		CV
7440-02-0	Nickel	0.58	U		P
7440-09-7	Potassium	14600		E	P
7782-49-2	Selenium	1.6			P
7440-22-4	Silver	0.61	U		P
7440-23-5	Sodium	292	B		P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	0.65	B		P
7440-66-6	Zinc	22.3		E	P
57-12-5	Cyanide	1.4	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNWPPLT17

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 535362

Level (low/med): LOW Date Received: 07/22/03

% Solids: 34.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	409			P
7440-36-0	Antimony	1.3	B		P
7440-38-2	Arsenic	2.9			P
7440-39-3	Barium	277			P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	0.30	B		P
7440-70-2	Calcium	15000			P
7440-47-3	Chromium	0.39	U		P
7440-48-4	Cobalt	0.56	U		P
7440-50-8	Copper	6.1	B		P
7439-89-6	Iron	692			P
7439-92-1	Lead	1.1			P
7439-95-4	Magnesium	6250			P
7439-96-5	Manganese	212			P
7439-97-6	Mercury	0.047	U		CV
7440-02-0	Nickel	0.59	U		P
7440-09-7	Potassium	14000		E	P
7782-49-2	Selenium	1.4			P
7440-22-4	Silver	0.62	U		P
7440-23-5	Sodium	317	B		P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	1.6	B		P
7440-66-6	Zinc	20.9		E	P
57-12-5	Cyanide	1.4	U	N	AS

Color Before: green Clarity Before: Texture: medium

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MONU-WP-PLT-14

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 533809

Level (low/med): LOW Date Received: 07/12/03

% Solids: 31.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	220			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	10.6			P
7440-39-3	Barium	86.3			P
7440-41-7	Beryllium	0.16	B		P
7440-43-9	Cadmium	1.0	B		P
7440-70-2	Calcium	12000			P
7440-47-3	Chromium	0.38	U		P
7440-48-4	Cobalt	0.54	U		P
7440-50-8	Copper	5.0	B		P
7439-89-6	Iron	642			P
7439-92-1	Lead	2.7			P
7439-95-4	Magnesium	4640			P
7439-96-5	Manganese	118			P
7439-97-6	Mercury	0.052	U		CV
7440-02-0	Nickel	0.57	U		P
7440-09-7	Potassium	15900		E	P
7782-49-2	Selenium	0.92	U		P
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	381	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	1.2	B		P
7440-66-6	Zinc	53.6		E	P
57-12-5	Cyanide	1.5	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MONU-WP-PLT-15

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 533808

Level (low/med): LOW Date Received: 07/12/03

% Solids: 35.2

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	206			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	6.1			P
7440-39-3	Barium	51.9	B		P
7440-41-7	Beryllium	0.13	B		P
7440-43-9	Cadmium	0.78	B		P
7440-70-2	Calcium	9750			P
7440-47-3	Chromium	0.38	U		P
7440-48-4	Cobalt	0.55	U		P
7440-50-8	Copper	5.1	B		P
7439-89-6	Iron	535			P
7439-92-1	Lead	1.2			P
7439-95-4	Magnesium	4500			P
7439-96-5	Manganese	169			P
7439-97-6	Mercury	0.046	U		CV
7440-02-0	Nickel	0.57	U		P
7440-09-7	Potassium	14900		E	P
7782-49-2	Selenium	0.93	U		P
7440-22-4	Silver	0.60	U		P
7440-23-5	Sodium	428	B		P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	0.95	B		P
7440-66-6	Zinc	35.9		E	P
57-12-5	Cyanide	1.3	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SHERWPPLT23

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534697

Level (low/med): LOW Date Received: 07/18/03

% Solids: 31.0

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	153			P
7440-36-0	Antimony	1.2	U		P
7440-38-2	Arsenic	1.3	U		P
7440-39-3	Barium	247			P
7440-41-7	Beryllium	0.11	B		P
7440-43-9	Cadmium	0.50	B		P
7440-70-2	Calcium	12200			P
7440-47-3	Chromium	0.37	U		P
7440-48-4	Cobalt	0.53	U		P
7440-50-8	Copper	4.6	B		P
7439-89-6	Iron	197			P
7439-92-1	Lead	1.3			P
7439-95-4	Magnesium	4690			P
7439-96-5	Manganese	291			P
7439-97-6	Mercury	0.050	B		CV
7440-02-0	Nickel	0.56	U		P
7440-09-7	Potassium	16700		E	P
7782-49-2	Selenium	0.91	B		P
7440-22-4	Silver	0.58	U		P
7440-23-5	Sodium	370	B		P
7440-28-0	Thallium	1.5	U		P
7440-62-2	Vanadium	0.81	B		P
7440-66-6	Zinc	27.2		E	P
57-12-5	Cyanide	1.6	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS
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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
SHERWPPLT23(100)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 534698

Level (low/med): LOW Date Received: 07/18/03

% Solids: 30.5

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	206			P
7440-36-0	Antimony	1.3	U		P
7440-38-2	Arsenic	1.3	U		P
7440-39-3	Barium	253			P
7440-41-7	Beryllium	0.10	B		P
7440-43-9	Cadmium	0.58	B		P
7440-70-2	Calcium	12600			P
7440-47-3	Chromium	0.39	U		P
7440-48-4	Cobalt	0.55	U		P
7440-50-8	Copper	5.0	B		P
7439-89-6	Iron	260			P
7439-92-1	Lead	1.3			P
7439-95-4	Magnesium	5060			P
7439-96-5	Manganese	283			P
7439-97-6	Mercury	0.049	B		CV
7440-02-0	Nickel	0.58	U		P
7440-09-7	Potassium	17300		E	P
7782-49-2	Selenium	1.0	B		P
7440-22-4	Silver	0.67	B		P
7440-23-5	Sodium	374	B		P
7440-28-0	Thallium	1.6	U		P
7440-62-2	Vanadium	0.71	B		P
7440-66-6	Zinc	28.4		E	P
57-12-5	Cyanide	1.7	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

TILL-WP-PLT-27

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Lab Sample ID: 533934

Level (low/med): LOW Date Received: 07/15/03

% Solids: 36.1

Concentration Units (ug/L or mg/kg dry weight): MG/KG

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	284			P
7440-36-0	Antimony	0.94	U		P
7440-38-2	Arsenic	1.0	B		P
7440-39-3	Barium	272			P
7440-41-7	Beryllium	0.087	B		P
7440-43-9	Cadmium	2.6			P
7440-70-2	Calcium	20000			P
7440-47-3	Chromium	0.48	B		P
7440-48-4	Cobalt	0.40	U		P
7440-50-8	Copper	5.0			P
7439-89-6	Iron	427			P
7439-92-1	Lead	2.7			P
7439-95-4	Magnesium	4120			P
7439-96-5	Manganese	158			P
7439-97-6	Mercury	0.070	B		CV
7440-02-0	Nickel	0.42	U		P
7440-09-7	Potassium	13700		E	P
7782-49-2	Selenium	0.70	B		P
7440-22-4	Silver	0.44	U		P
7440-23-5	Sodium	262	B		P
7440-28-0	Thallium	1.1	U		P
7440-62-2	Vanadium	0.90	B		P
7440-66-6	Zinc	70.2		E	P
57-12-5	Cyanide	1.1	U	N	AS

Color Before: green Clarity Before: Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	25370.00	97.6	30200.0	29720.00	98.4	29580.00	97.9	P
Antimony	250.0	256.50	102.6	300.0	314.20	104.7	311.80	103.9	P
Arsenic	250.0	255.50	102.2	100.0	104.80	104.8	103.50	103.5	P
Barium	500.0	501.80	100.4	200.0	201.40	100.7	200.90	100.4	P
Beryllium	500.0	509.20	101.8	100.0	99.83	99.8	99.87	99.9	P
Cadmium	500.0	497.10	99.4	100.0	100.10	100.1	99.63	99.6	P
Calcium	25000.0	24860.00	99.4	30200.0	29850.00	98.8	29650.00	98.2	P
Chromium	500.0	500.60	100.1	200.0	195.30	97.6	194.20	97.1	P
Cobalt	500.0	495.90	99.2	200.0	200.80	100.4	200.40	100.2	P
Copper	500.0	509.90	102.0	200.0	204.10	102.0	204.60	102.3	P
Iron	25500.0	25380.00	99.5	30200.0	29790.00	98.6	29670.00	98.2	P
Lead	1000.0	1008.00	100.8	400.0	401.60	100.4	398.60	99.6	P
Magnesium	25000.0	24570.00	98.3	30200.0	29670.00	98.2	29560.00	97.9	P
Manganese	500.0	498.10	99.6	200.0	199.40	99.7	198.60	99.3	P
Mercury	3.0	3.00	100.0	5.0	5.49	109.8	5.43	108.6	CV
Nickel	500.0	497.70	99.5	200.0	194.60	97.3	193.70	96.8	P
Potassium	25000.0	25180.00	100.7	30200.0	31200.00	103.3	31120.00	103.0	P
Selenium	250.0	247.60	99.0	100.0	99.67	99.7	100.80	100.8	P
Silver	500.0	498.80	99.8	100.0	104.00	104.0	104.10	104.1	P
Sodium	25000.0	23780.00	95.1	30200.0	28960.00	95.9	28980.00	96.0	P
Thallium	250.0	244.30	97.7	100.0	107.10	107.1	103.60	103.6	P
Vanadium	500.0	498.60	99.7	200.0	201.00	100.5	201.10	100.6	P
Zinc	500.0	505.70	101.1	200.0	202.30	101.2	202.30	101.2	P
Cyanide	120.0	109.26	91.0	150.0	152.87	101.9	154.97	103.3	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29140.00	96.5	29670.00	98.2	P
Antimony				300.0	305.40	101.8	314.30	104.8	P
Arsenic				100.0	100.30	100.3	102.50	102.5	P
Barium				200.0	198.30	99.2	201.50	100.8	P
Beryllium				100.0	98.84	98.8	100.50	100.5	P
Cadmium				100.0	98.51	98.5	100.60	100.6	P
Calcium				30200.0	29220.00	96.8	29860.00	98.9	P
Chromium				200.0	191.10	95.6	195.10	97.6	P
Cobalt				200.0	197.20	98.6	201.00	100.5	P
Copper				200.0	201.50	100.8	205.10	102.6	P
Iron				30200.0	29240.00	96.8	29810.00	98.7	P
Lead				400.0	393.00	98.2	399.90	100.0	P
Magnesium				30200.0	29150.00	96.5	29730.00	98.4	P
Manganese				200.0	195.80	97.9	199.50	99.8	P
Nickel				200.0	191.70	95.8	194.00	97.0	P
Potassium				30200.0	30700.00	101.7	31210.00	103.3	P
Selenium				100.0	98.70	98.7	98.43	98.4	P
Silver				100.0	102.80	102.8	104.20	104.2	P
Sodium				30200.0	28930.00	95.8	28860.00	95.6	P
Thallium				100.0	97.33	97.3	101.70	101.7	P
Vanadium				200.0	197.40	98.7	200.80	100.4	P
Zinc				200.0	199.70	99.8	203.60	101.8	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29210.00	96.7			P
Antimony				300.0	305.60	101.9			P
Arsenic				100.0	99.66	99.7			P
Barium				200.0	198.40	99.2			P
Beryllium				100.0	98.54	98.5			P
Cadmium				100.0	98.29	98.3			P
Calcium				30200.0	29370.00	97.3			P
Chromium				200.0	194.10	97.0			P
Cobalt				200.0	197.70	98.8			P
Copper				200.0	201.70	100.8			P
Iron				30200.0	29280.00	97.0			P
Lead				400.0	392.50	98.1			P
Magnesium				30200.0	29170.00	96.6			P
Manganese				200.0	196.80	98.4			P
Nickel				200.0	197.60	98.8			P
Potassium				30200.0	30650.00	101.5			P
Selenium				100.0	99.94	99.9			P
Silver				100.0	102.80	102.8			P
Sodium				30200.0	28500.00	94.4			P
Thallium				100.0	100.20	100.2			P
Vanadium				200.0	197.60	98.8			P
Zinc				200.0	199.70	99.8			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	987.40	98.7	400.0	393.20	98.3	387.40	96.8	P
Mercury	3.0	2.96	98.7	5.0	5.43	108.6	5.33	106.6	CV
Cyanide	120.0	129.19	107.7	150.0	147.38	98.3	148.86	99.2	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead				400.0	384.80	96.2	390.30	97.6	P
Cyanide				150.0	146.51	97.7			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead				400.0	391.00	97.8			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	956.30	95.6	400.0	378.50	94.6	388.70	97.2	P
Mercury	3.0	3.06	102.0	5.0	5.05	101.0	4.68	93.6	CV
Cyanide	120.0	119.46	99.6	150.0	141.85	94.6	140.20	93.5	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead				400.0	385.00	96.2			P
Mercury				5.0	4.92	98.4	4.82	96.4	CV
Cyanide				150.0	143.25	95.5			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26350.00	101.3	30200.0	30440.00	100.8	30260.00	100.2	P
Antimony	250.0	250.60	100.2	300.0	303.90	101.3	303.20	101.1	P
Arsenic	250.0	245.90	98.4	100.0	98.91	98.9	101.20	101.2	P
Barium	500.0	493.60	98.7	200.0	201.70	100.8	201.00	100.5	P
Beryllium	500.0	501.00	100.2	100.0	99.94	99.9	100.70	100.7	P
Cadmium	500.0	490.30	98.1	100.0	98.85	98.8	99.80	99.8	P
Calcium	25000.0	25630.00	102.5	30200.0	30640.00	101.5	30850.00	102.2	P
Chromium	500.0	498.00	99.6	200.0	199.20	99.6	200.20	100.1	P
Cobalt	500.0	489.90	98.0	200.0	199.30	99.6	200.00	100.0	P
Copper	500.0	502.50	100.5	200.0	204.60	102.3	204.20	102.1	P
Iron	25500.0	26480.00	103.8	30200.0	30510.00	101.0	30670.00	101.6	P
Lead	1000.0	987.60	98.8	400.0	392.70	98.2	397.60	99.4	P
Magnesium	25000.0	25590.00	102.4	30200.0	30310.00	100.4	30550.00	101.2	P
Manganese	500.0	491.60	98.3	200.0	199.80	99.9	200.00	100.0	P
Mercury	3.0	2.97	99.0	5.0	4.83	96.6	4.63	92.6	CV
Nickel	500.0	495.00	99.0	200.0	198.00	99.0	198.20	99.1	P
Potassium	25000.0	26340.00	105.4	30200.0	31580.00	104.6	31430.00	104.1	P
Selenium	250.0	242.10	96.8	100.0	100.10	100.1	99.95	100.0	P
Silver	500.0	497.80	99.6	100.0	100.90	100.9	101.70	101.7	P
Sodium	25000.0	25240.00	101.0	30200.0	29430.00	97.5	29560.00	97.9	P
Thallium	250.0	236.00	94.4	100.0	97.47	97.5	96.25	96.2	P
Vanadium	500.0	495.50	99.1	200.0	201.10	100.6	201.70	100.8	P
Zinc	500.0	500.90	100.2	200.0	202.70	101.4	204.00	102.0	P
Cyanide	120.0	122.17	101.8	150.0	148.25	98.8	153.71	102.5	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	30560.00	101.2			P
Antimony				300.0	305.30	101.8			P
Arsenic				100.0	102.20	102.2			P
Barium				200.0	201.80	100.9			P
Beryllium				100.0	100.30	100.3			P
Cadmium				100.0	99.55	99.6			P
Calcium				30200.0	30970.00	102.5			P
Chromium				200.0	200.20	100.1			P
Cobalt				200.0	199.50	99.8			P
Copper				200.0	206.20	103.1			P
Iron				30200.0	30690.00	101.6			P
Lead				400.0	396.50	99.1			P
Magnesium				30200.0	30610.00	101.4			P
Manganese				200.0	199.80	99.9			P
Mercury				5.0	4.67	93.4			CV
Nickel				200.0	199.10	99.6			P
Potassium				30200.0	32060.00	106.2			P
Selenium				100.0	101.80	101.8			P
Silver				100.0	101.30	101.3			P
Sodium				30200.0	29660.00	98.2			P
Thallium				100.0	98.77	98.8			P
Vanadium				200.0	201.20	100.6			P
Zinc				200.0	204.50	102.2			P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury	3.0	2.82	94.0	5.0	4.90	98.0	4.71	94.2	CV
Cyanide	120.0	117.46	97.9	150.0	140.94	94.0	143.67	95.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury				5.0	4.61	92.2			CV
Cyanide				150.0	142.40	94.9	142.75	95.2	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Mercury	3.0	2.73	91.0	5.0	4.93	98.6	4.77	95.4	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

	Initial Calibration			Continuing Calibration					
Analyte	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Mercury				5.0	4.87	97.4	4.85	97.0	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	473.80	118.4	471.00	117.8
Antimony				120.0	127.10	105.9	125.50	104.6
Arsenic				20.0	20.93	104.6	19.80	99.0
Barium				400.0	398.90	99.7	391.40	97.8
Beryllium				10.0	10.20	102.0	10.03	100.3
Cadmium				10.0	10.03	100.3	9.99	99.9
Calcium				10000.0	10280.00	102.8	10200.00	102.0
Chromium				20.0	25.59	128.0	22.24	111.2
Cobalt				100.0	98.65	98.6	97.06	97.1
Copper				50.0	50.95	101.9	49.92	99.8
Iron				200.0	294.40	147.2	268.30	134.2
Lead				6.0	6.45	107.5	6.35	105.8
Magnesium				10000.0	9944.00	99.4	9851.00	98.5
Manganese				30.0	29.81	99.4	29.29	97.6
Mercury	0.2	0.20	100.0					
Nickel				80.0	83.02	103.8	85.52	106.9
Potassium				10000.0	11570.00	115.7	11350.00	113.5
Selenium				10.0	10.05	100.5	9.37	93.7
Silver				20.0	21.92	109.6	21.31	106.6
Sodium				10000.0	9592.00	95.9	9503.00	95.0
Thallium				20.0	23.41	117.0	23.17	115.8
Vanadium				100.0	100.30	100.3	97.90	97.9
Zinc				40.0	40.84	102.1	40.73	101.8

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Lead				6.0	4.64	77.3	4.06	67.7
Mercury	0.2	0.16	80.0					

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Lead				6.0	6.23	103.8	4.79	79.8
Mercury	0.2	0.17	85.0					

Control Limits: no limits have been established by EPA at this time

2B-IN
CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	510.40	127.6	534.70	133.7
Antimony				120.0	120.60	100.5	120.90	100.8
Arsenic				20.0	20.87	104.4	20.53	102.6
Barium				400.0	397.70	99.4	398.00	99.5
Beryllium				10.0	10.23	102.3	10.28	102.8
Cadmium				10.0	10.46	104.6	10.42	104.2
Calcium				10000.0	10560.00	105.6	10680.00	106.8
Chromium				20.0	21.52	107.6	22.67	113.4
Cobalt				100.0	97.89	97.9	98.69	98.7
Copper				50.0	51.86	103.7	51.86	103.7
Iron				200.0	285.30	142.6	295.10	147.6
Lead				6.0	5.99	99.8	6.77	112.8
Magnesium				10000.0	10310.00	103.1	10420.00	104.2
Manganese				30.0	30.60	102.0	30.96	103.2
Mercury	0.2	0.21	105.0					
Nickel				80.0	79.56	99.4	83.25	104.1
Potassium				10000.0	11030.00	110.3	11230.00	112.3
Selenium				10.0	11.70	117.0	9.12	91.2
Silver				20.0	20.25	101.2	20.45	102.2
Sodium				10000.0	10160.00	101.6	10090.00	100.9
Thallium				20.0	23.50	117.5	19.01	95.0
Vanadium				100.0	99.96	100.0	100.40	100.4
Zinc				40.0	42.10	105.2	42.47	106.2

Control Limits: no limits have been established by EPA at this time

2B-IN
CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Mercury	0.2	0.22	110.0					

Control Limits: no limits have been established by EPA at this time

2B-IN
CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Mercury	0.2	0.17	85.0					

Control Limits: no limits have been established by EPA at this time

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOLID

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	-27.3	B	-2.952	B	P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U	0.470	U	P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U	0.480	U	P
Barium	5.9	U	5.9	U	5.9	U	5.9	U	0.590	U	P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.035	B	P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.060	U	P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U	18.210	U	P
Chromium	-5.7	B	-6.8	B	-7.2	B	-6.6	B	-0.520	B	P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U	0.200	U	P
Copper	2.4	U	2.4	U	2.4	U	2.4	U	0.240	U	P
Iron	33.3	U	33.3	U	33.3	U	33.3	U	3.413	B	P
Lead	1.3	U	1.3	U	1.3	U	1.3	U	0.257	B	P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U	17.830	U	P
Manganese	-1.7	B	-1.8	B	-1.9	B	-1.7	B	-0.168	B	P
Mercury	0.1	U	0.1	U	0.1	U			0.017	U	CV
Nickel	-6.9	B	-7.4	B	-7.9	B	-7.2	B	-1.036	B	P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U	39.300	U	P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U	0.340	U	P
Silver	2.2	U	2.2	U	2.2	U	2.2	U	0.220	U	P
Sodium	472.7	U	472.7	U	472.7	U	541.8	B	124.300	B	P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U	0.570	U	P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	0.200	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	0.100	U	P
Cyanide	10.0	U	10.0	U	10.0	U			0.467	U	AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOLID

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			23.6	U	-28.5	B			-4.752	B	P
Antimony			4.7	U	4.7	U			0.470	U	P
Arsenic			4.8	U	4.8	U			0.480	U	P
Barium			5.9	U	5.9	U			0.590	U	P
Beryllium			0.2	U	0.2	B			0.025	B	P
Cadmium			0.6	U	0.6	U			0.060	U	P
Calcium			182.1	U	182.1	U			18.210	U	P
Chromium			-6.7	B	-6.5	B			-0.400	B	P
Cobalt			2.0	U	2.0	U			0.200	U	P
Copper			2.4	U	2.4	U			0.240	U	P
Iron			33.3	U	33.3	U			3.330	U	P
Lead			2.6	B	1.3	U			0.150	U	P
Magnesium			178.3	U	178.3	U			17.830	U	P
Manganese			-1.8	B	-1.7	B			-0.145	B	P
Nickel			-9.0	B	-8.7	B			-0.681	B	P
Potassium			393.0	U	393.0	U			39.300	U	P
Selenium			3.4	U	3.4	U			0.340	U	P
Silver			2.2	U	2.2	U			0.220	U	P
Sodium			472.7	U	472.7	U			129.500	B	P
Thallium			5.7	U	5.7	U			0.570	U	P
Vanadium			2.0	U	2.0	U			0.200	U	P
Zinc			1.0	U	1.0	U			0.100	U	P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.495	U	AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead	1.3	U	-2.0	B	1.3	U	-1.9	B			P
Mercury	0.1	U	0.1	U	0.1	U					CV

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead			-1.9	B	-1.6	B					P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead	1.5	U	1.5	U	1.5	U	1.5	U			P
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury			0.1	U					0.017	U	CV

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U			0.463	U	AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	37.3	B			P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U			P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U			P
Barium	5.9	U	5.9	U	5.9	U	5.9	U			P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U			P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U			P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U			P
Chromium	1.4	U	1.4	U	1.4	U	1.4	U			P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U			P
Copper	2.4	U	2.4	U	2.4	U	2.4	U			P
Iron	33.3	U	33.3	U	33.3	U	33.3	U			P
Lead	1.5	B	1.3	U	1.3	U	1.3	U			P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U			P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Mercury	0.1	U	0.1	U	0.1	U	-0.1	B			CV
Nickel	2.1	U	2.1	U	2.1	U	2.1	U			P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U			P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U			P
Silver	2.2	U	2.2	U	2.2	U	2.2	U			P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U			P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U			P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U			P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U			P

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.495	U	AS

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV
Cyanide			10.0	U							AS

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): SOIL

Preparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury	0.1	U	0.1	U	0.1	U	0.1	U	0.017	U	CV

USEPA-CLP FORMS

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Mercury			0.1	B							CV

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	486000	486900.0	100.9	477500	480100.0	99.5
Antimony	0	596	-2	639.4	107.3	1	633.7	106.3
Arsenic	0	102	10	108.1	106.0	5	109.2	107.1
Barium	0	503	2	509.7	101.3	2	505.3	100.5
Beryllium	0	482	0	490.2	101.7	0	489.3	101.5
Cadmium	0	938	3	955.9	101.9	3	953.6	101.7
Calcium	500000	477840	486400	489800.0	102.5	482900	485800.0	101.7
Chromium	0	483	-3	486.9	100.8	-3	482.2	99.8
Cobalt	0	457	-1	469.4	102.7	-1	465.2	101.8
Copper	0	526	3	525.9	100.0	3	523.0	99.4
Iron	200000	191980	198200	197400.0	102.8	196100	195500.0	101.8
Lead	0	49	-4	40.4	82.4	-6	40.4	82.4
Magnesium	500000	521880	528200	532300.0	102.0	522600	528000.0	101.2
Manganese	0	474	0	482.0	101.7	0	478.0	100.8
Nickel	0	952	-6	979.9	102.9	-6	971.8	102.1
Potassium	0	0	191	173.1		278	241.1	
Selenium	0	47	5	56.4	120.0	7	53.9	114.7
Silver	0	213	1	214.6	100.8	1	213.6	100.3
Sodium	0	0	110	-24.5		7	-32.8	
Thallium	0	89	-4	85.9	96.5	-5	91.8	103.1
Vanadium	0	478	1	476.0	99.6	1	472.3	98.8
Zinc	0	998	5	1017.0	101.9	6	1013.0	101.5

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	49	-5	41.8	85.3	-3	40.6	82.9

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	44	2	47.1	107.0	2	46.5	105.7

USEPA-CLP FORMS

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	507400	502200.0	104.0	508100	503700.0	104.3
Antimony	0	596	-5	613.0	102.9	0	610.9	102.5
Arsenic	0	102	8	107.1	105.0	6	106.1	104.0
Barium	0	503	2	498.3	99.1	2	499.2	99.2
Beryllium	0	482	0	486.2	100.9	0	487.2	101.1
Cadmium	0	938	0	936.2	99.8	0	936.4	99.8
Calcium	500000	477840	498400	498800.0	104.4	504600	501600.0	105.0
Chromium	0	483	4	477.1	98.8	4	477.9	98.9
Cobalt	0	457	-1	454.5	99.5	-1	454.0	99.3
Copper	0	526	4	511.7	97.3	4	513.1	97.5
Iron	200000	191980	201700	199100.0	103.7	203000	199300.0	103.8
Lead	0	49	-2	44.8	91.4	0	44.2	90.2
Magnesium	500000	521880	540400	541400.0	103.7	545300	542800.0	104.0
Manganese	0	474	1	471.9	99.6	1	471.1	99.4
Nickel	0	952	0	938.8	98.6	1	940.5	98.8
Potassium	0	0	-82	-76.1		-20	-19.3	
Selenium	0	47	0	41.8	88.9	-1	46.5	98.9
Silver	0	213	0	213.8	100.4	0	213.8	100.4
Sodium	0	0	87	-50.0		-79	-133.8	
Thallium	0	89	-8	86.2	96.9	-5	92.2	103.6
Vanadium	0	478	2	469.2	98.2	2	469.3	98.2
Zinc	0	998	3	1013.0	101.5	3	1016.0	101.8

USEPA-CLP FORMS

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANBGPLT36S

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Matrix (soil/water): SOLID Level (low/med): LOW

% Solids for Sample: 35.6

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75 - 125	750.8095		213.0187		476.10	113.0		P
Antimony	75 - 125	121.8102		1.0395	U	119.02	102.3		P
Arsenic	75 - 125	8.5103		1.0617	U	9.52	89.4		P
Barium	75 - 125	977.9091		505.1757		476.10	99.3		P
Beryllium	75 - 125	11.9287		0.0539	B	11.90	99.8		P
Cadmium	75 - 125	11.9144		0.1327	U	11.90	100.1		P
Chromium	75 - 125	47.6100		0.3097	U	47.61	100.0		P
Cobalt	75 - 125	116.5492		0.4424	U	119.02	97.9		P
Copper	75 - 125	66.8444		4.8018	B	59.51	104.3		P
Iron	75 - 125	502.0473		246.8371		238.05	107.2		P
Lead	75 - 125	4.9990		0.3837	B	4.76	97.0		P
Manganese	75 - 125	449.4382		324.4714		119.02	105.0		P
Mercury	75 - 125	0.4392		0.0446	U	0.45	97.6		CV
Nickel	75 - 125	114.6686		0.4645	U	119.02	96.3		P
Selenium	75 - 125	3.1423		0.9491	B	2.38	92.2		P
Silver	75 - 125	11.7620		0.4866	U	11.90	98.8		P
Thallium	75 - 125	10.3599		1.2607	U	11.90	87.1		P
Vanadium	75 - 125	119.6201		0.5992	B	119.02	100.0		P
Zinc	75 - 125	137.1882		13.4345		119.02	104.0		P
Cyanide	75 - 125	6.6028		1.4045	U	13.91	47.5	N	AS

Comments:

USEPA-CLP FORMS

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANBGPLT36A

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS _____ SDG No.: GCV001

Matrix (soil/water): SOLID Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		3114.00		963.10		2000.0	107.5		P
Antimony		537.20		4.70	U	500.0	107.4		P
Arsenic		35.79		4.80	U	40.0	89.5		P
Barium		4297.00		2284.00		2000.0	100.6		P
Beryllium		52.18		0.24	B	50.0	103.9		P
Cadmium		52.43		0.60	U	50.0	104.9		P
Chromium		209.80		1.40	U	200.0	104.9		P
Cobalt		513.30		2.00	U	500.0	102.7		P
Copper		294.90		21.71	B	250.0	109.3		P
Iron		2133.00		1116.00		1000.0	101.7		P
Lead		24.12		1.74	B	20.0	111.9		P
Manganese		1983.00		1467.00		500.0	103.2		P
Nickel		506.30		2.10	U	500.0	101.3		P
Selenium		11.53		4.29	B	10.0	72.4		P
Silver		52.72		2.20	U	50.0	105.4		P
Thallium		41.72		5.70	U	50.0	83.4		P
Vanadium		525.80		2.71	B	500.0	104.6		P
Zinc		583.80		60.74		500.0	104.6		P
Cyanide		20.14		10.00	U	20.0	100.7		AS

Comments: _____

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DUPLICATES

SAMPLE NO.

GRANBGPLT36D

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Level (low/med): LOW

% Solids for Sample: 35.6 % Solids for Duplicate: 36.3

Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum	44.2	213.0187		211.6685		0.6		P
Antimony		1.0395	U	1.1683	U			P
Arsenic		1.0617	U	1.1932	U			P
Barium		505.1757		512.5784		1.5		P
Beryllium		0.0539	B	0.1035	B	63.0		P
Cadmium		0.1327	U	0.1768	B	200.0		P
Calcium		17329.4707		17763.7500		2.5		P
Chromium		0.3097	U	0.3480	U			P
Cobalt		0.4424	U	0.4972	U			P
Copper		4.8018	B	4.4720	B	7.1		P
Iron		246.8371		256.2892		3.8		P
Lead		0.3837	B	0.3910	B	1.9		P
Magnesium	1105.9	4567.3721		4618.6738		1.1		P
Manganese		324.4714		329.1240		1.4		P
Mercury		0.0446	U	0.0571	B	200.0		CV
Nickel		0.4645	U	0.5220	U			P
Potassium		16227.9902		16545.6895		1.9		P
Selenium		0.9491	B	1.1062	B	15.3		P
Silver		0.4866	U	0.5469	U			P
Sodium		284.6590	B	300.0398	B	5.3		P
Thallium		1.2607	U	1.4169	U			P
Vanadium		0.5992	B	0.7087	B	16.7		P
Zinc	4.4	13.4345		13.5055		0.5		P
Cyanide		1.4045	U	1.2213	U			AS

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	187.7		160.0	240.0	93.8
Antimony				50.0	49.6		40.0	60.0	99.2
Arsenic				24.0	22.5		19.2	28.8	93.8
Barium				200.0	190.0		160.0	240.0	95.0
Beryllium				5.0	4.9		4.0	6.0	98.0
Cadmium				25.0	24.1		20.0	30.0	96.4
Calcium				2000.0	1932.0		1600.0	2400.0	96.6
Chromium				20.0	19.2		16.0	24.0	96.0
Cobalt				50.0	47.6		40.0	60.0	95.2
Copper				25.0	25.0		20.0	30.0	100.0
Iron				100.0	95.5		80.0	120.0	95.5
Lead				22.0	21.2		17.6	26.4	96.4
Magnesium				2000.0	1872.0		1600.0	2400.0	93.6
Manganese				50.0	48.4		40.0	60.0	96.8
Mercury				0.1	0.1		0.1	0.1	100.0
Nickel				50.0	47.1		40.0	60.0	94.2
Potassium				2000.0	1895.0		1600.0	2400.0	94.8
Selenium				21.0	18.8		16.8	25.2	89.5
Silver				25.0	24.0		20.0	30.0	96.0
Sodium				2000.0	1925.0		1600.0	2400.0	96.2
Thallium				25.0	23.2		20.0	30.0	92.8
Vanadium				50.0	48.5		40.0	60.0	97.0
Zinc				50.0	48.5		40.0	60.0	97.0
Cyanide				9.6	8.5		7.4	11.8	88.5

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum				200.0	203.6		160.0	240.0	101.8
Antimony				50.0	52.5		40.0	60.0	105.0
Arsenic				24.0	23.6		19.2	28.8	98.3
Barium				200.0	202.7		160.0	240.0	101.4
Beryllium				5.0	5.2		4.0	6.0	104.0
Cadmium				25.0	25.7		20.0	30.0	102.8
Calcium				2000.0	2052.0		1600.0	2400.0	102.6
Chromium				20.0	20.5		16.0	24.0	102.5
Cobalt				50.0	50.7		40.0	60.0	101.4
Copper				25.0	27.0		20.0	30.0	108.0
Iron				100.0	100.2		80.0	120.0	100.2
Lead				22.0	22.6		17.6	26.4	102.7
Magnesium				2000.0	1994.0		1600.0	2400.0	99.7
Manganese				50.0	51.6		40.0	60.0	103.2
Nickel				50.0	50.4		40.0	60.0	100.8
Potassium				2000.0	1978.0		1600.0	2400.0	98.9
Selenium				21.0	19.8		16.8	25.2	94.3
Silver				25.0	25.5		20.0	30.0	102.0
Sodium				2000.0	2046.0		1600.0	2400.0	102.3
Thallium				25.0	24.4		20.0	30.0	97.6
Vanadium				50.0	51.9		40.0	60.0	103.8
Zinc				50.0	51.7		40.0	60.0	103.4

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				9.6	8.6		7.4 11.8	89.6

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Mercury				0.1	0.1		0.1	0.1	100.0
Cyanide				9.6	8.9		7.4	11.8	92.7

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Mercury				0.1	0.1		0.1 0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	6.1		5.4 6.6	101.7

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Mercury				0.1	0.1		0.1	0.1	100.0
Cyanide				6.0	5.9		5.4	6.6	98.3

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Mercury				0.1	0.1		0.1	0.1	100.0

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum				200.0	196.7		160.0 240.0	98.4
Antimony				50.0	51.7		40.0 60.0	103.4
Arsenic				24.0	23.4		19.2 28.8	97.5
Barium				200.0	198.6		160.0 240.0	99.3
Beryllium				5.0	5.1		4.0 6.0	102.0
Cadmium				25.0	25.2		20.0 30.0	100.8
Calcium				2000.0	2008.0		1600.0 2400.0	100.4
Chromium				20.0	20.1		16.0 24.0	100.5
Cobalt				50.0	49.7		40.0 60.0	99.4
Copper				25.0	26.4		20.0 30.0	105.6
Iron				100.0	96.9		80.0 120.0	96.9
Lead				22.0	22.2		17.6 26.4	100.9
Magnesium				2000.0	1950.0		1600.0 2400.0	97.5
Manganese				50.0	50.6		40.0 60.0	101.2
Nickel				50.0	49.2		40.0 60.0	98.4
Potassium				2000.0	1944.0		1600.0 2400.0	97.2
Selenium				21.0	19.5		16.8 25.2	92.9
Silver				25.0	25.1		20.0 30.0	100.4
Sodium				2000.0	2000.0		1600.0 2400.0	100.0
Thallium				25.0	24.3		20.0 30.0	97.2
Vanadium				50.0	50.8		40.0 60.0	101.6
Zinc				50.0	50.3		40.0 60.0	100.6
Cyanide				9.6	8.7		7.4 11.8	90.6

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Solid LCS Source: IV, ENVEXP, LOT0899

Aqueous LCS Source: _____

	Aqueous (ug/L)			Solid (mg/kg)				
Analyte	True	Found	%R	True	Found	C	Limits	%R
Cyanide				6.0	5.9		5.4 6.6	98.3

9
ICP SERIAL DILUTIONS

SAMPLE NO.

GRANBGPLT36L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

Matrix (soil/water): SOLID Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	963.10		1362.00		41.4		P
Antimony	4.70	U	23.50	U			P
Arsenic	4.80	U	24.00	U			P
Barium	2284.00		2291.00		0.3		P
Beryllium	0.24	B	1.00	U	100.0		P
Cadmium	0.60	U	3.00	U			P
Calcium	78350.00		82480.00		5.3		P
Chromium	1.40	U	7.00	U			P
Cobalt	2.00	U	10.00	U			P
Copper	21.71	B	14.03	B	35.4		P
Iron	1116.00		1304.00		16.8		P
Lead	1.74	B	6.50	U	100.0		P
Magnesium	20650.00		21850.00	B	5.8		P
Manganese	1467.00		1490.00		1.6		P
Nickel	2.10	U	10.50	U			P
Potassium	73370.00		90980.00		24.0	E	P
Selenium	4.29	B	17.00	U	100.0		P
Silver	2.20	U	11.00	U			P
Sodium	1287.00	B	2363.50	U	100.0		P
Thallium	5.70	U	54.43		100.0		P
Vanadium	2.71	B	10.00	U	100.0		P
Zinc	60.74		72.79	B	19.8	E	P

USEPA-CLP FORMS

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

ICP ID Number: Date: 07/01/03

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

USEPA-CLP FORMS

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: _____ Date: 07/01/03

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments: _____

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCV001

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Iron	271.441		100	33.3	P
Lead	220.353		3	1.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Selenium	196.026		5	3.4	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Thallium	190.864		10	5.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments:

USEPA-CLP FORMS

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Lead	220.353		3	1.5	P

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for: Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 Date: 06/30/03

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCY001

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 10/01/02

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 4 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Iron	10.00	1000000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments: _____

USEPA-CLP FORMS

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

ICP ID Number: TJA ICAP 6 Date: 07/01/03

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Lead	10.00	50000.0	P

Comments: _____

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
ICV	07/21/03	50.0	50.0
LCSDS0721A	07/21/03	1.04	50.0
LCSS0721A	07/21/03	1.06	50.0
MONU-WP-PLT-14	07/21/03	1.05	50.0
MONU-WP-PLT-15	07/21/03	1.10	50.0
PBS0721A	07/21/03	1.07	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CENT-WP-PLT-31	07/22/03	0.96	50.0
ICV	07/22/03	50.0	50.0
LCSS0722A	07/22/03	1.06	50.0
PBS0722A	07/22/03	1.01	50.0
TILL-WP-PLT-27	07/22/03	1.23	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CAPMWPPLT20	07/27/03	0.98	50.0
GRANBGPLT34	07/27/03	1.10	50.0
GRANBGPLT35	07/27/03	1.05	50.0
GRANBGPLT36	07/27/03	1.00	50.0
GRANBGPLT36D	07/27/03	1.15	50.0
GRANBGPLT36S	07/27/03	1.01	50.0
ICV	07/27/03	50.0	50.0
LCSS0727A	07/27/03	1.02	50.0
PBS0727A	07/27/03	1.00	50.0
SHERWPPLT23	07/27/03	1.04	50.0
SHERWPPLT23(100)	07/27/03	0.99	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
AJAXPDPLT06	07/29/03	1.01	50.0
AJAXWPPLT08	07/29/03	1.09	50.0
ICV	07/29/03	50.0	50.0
LCSS0729C	07/29/03	1.00	50.0
LUCABGPLT19	07/29/03	1.00	50.0
MAGNPDPLT11	07/29/03	1.02	50.0
MAGNWPPLT14	07/29/03	1.02	50.0
MAGNWPPLT17	07/29/03	1.05	50.0
PBS0729C	07/29/03	1.08	50.0

USEPA-CLP FORMS

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: AS

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
BLUEWPPLT20	08/01/03	1.02	50.0
BLUEWPPLT24	08/01/03	1.00	50.0
EBLK2	08/01/03	1.02	50.0
ICV	08/01/03	50.0	50.0
LCS0801B	08/01/03	1.00	50.0
LCSD0801B	08/01/03	1.00	50.0
PBS0801B	08/01/03	1.01	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
EBLK1	07/21/03	0.60	100.0
LCSS0721G	07/21/03	1.00	100.0
MONU-WP-PLT-14	07/21/03	0.61	100.0
MONU-WP-PLT-15	07/21/03	0.62	100.0
PBS0721G	07/21/03	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: CV

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CAPMWPPLT20	07/31/03	0.60	100.0
GRANBGPLT34	07/31/03	0.68	100.0
GRANBGPLT35	07/31/03	0.65	100.0
GRANBGPLT36	07/31/03	0.63	100.0
GRANBGPLT36D	07/31/03	0.63	100.0
GRANBGPLT36S	07/31/03	0.63	100.0
LCSS0731A	07/31/03	1.00	100.0
PBS0731A	07/31/03	0.60	100.0
SHERWPPLT23	07/31/03	0.64	100.0
SHERWPPLT23(100)	07/31/03	0.68	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: CV

EPA Sample No.	Preparation Date	Initial Weight (g)	Volume (mL)
CENT-WP-PLT-31	07/31/03	0.63	100.0
LCSS0731B	07/31/03	1.00	100.0
PBS0731B	07/31/03	0.60	100.0
TILL-WP-PLT-27	07/31/03	0.67	100.0

USEPA-CLP FORMS

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXPDPLT06	08/08/03	0.61	100.0
AJAXWPPLT08	08/08/03	0.61	100.0
LCSS0808B	08/08/03	1.00	100.0
LUCABGPLT19	08/08/03	0.60	100.0
MAGNPDPLT11	08/08/03	0.69	100.0
MAGNWPPLT14	08/08/03	0.61	100.0
MAGNWPPLT17	08/08/03	0.62	100.0
PBS0808B	08/08/03	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLUEWPPLT20	08/13/03	0.65	100.0
BLUEWPPLT24	08/13/03	0.60	100.0
EBLK2	08/13/03	0.61	100.0
LCSS0813B	08/13/03	1.00	100.0
PBS0813B	08/13/03	0.60	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLUEWPPLT20	08/07/03	1.20	100.0
BLUEWPPLT24	08/07/03	1.09	100.0
CAPMWPPLT20	08/07/03	1.23	100.0
CENT-WP-PLT-31	08/07/03	1.06	100.0
EBLK1	08/07/03	1.00	100.0
EBLK2	08/07/03	1.00	100.0
GRANBGPLT34	08/07/03	1.21	100.0
GRANBGPLT35	08/07/03	1.27	100.0
GRANBGPLT36	08/07/03	1.27	100.0
GRANBGPLT36D	08/07/03	1.13	100.0
GRANBGPLT36S	08/07/03	1.18	100.0
LCSS0807J	08/07/03	1.00	100.0
MONU-WP-PLT-14	08/07/03	1.17	100.0
MONU-WP-PLT-15	08/07/03	1.04	100.0
PBS0807J	08/07/03	1.00	100.0
SHERWPPLT23	08/07/03	1.22	100.0
SHERWPPLT23(100)	08/07/03	1.19	100.0
TILL-WP-PLT-27	08/07/03	1.39	100.0

USEPA-CLP FORMS

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXPDPLT06	08/15/03	1.09	100.0
AJAXWPPLT08	08/15/03	1.01	100.0
LCSDS0815C	08/15/03	1.00	100.0
LCSS0815C	08/15/03	1.00	100.0
LUCABGPLT19	08/15/03	1.18	100.0
MAGNPDPLT11	08/15/03	1.00	100.0
MAGNWPPLT14	08/15/03	1.04	100.0
MAGNWPPLT17	08/15/03	1.04	100.0
PBS0815C	08/15/03	1.00	100.0

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/21/03 End Date: 07/21/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1618																								X
S10	1.00	1619																								X
S30	1.00	1620																								X
S50	1.00	1621																								X
S100	1.00	1622																								X
S200	1.00	1623																								X
S300	1.00	1624																								X
ICV	1.00	1626																								X
ICB	1.00	1627																								X
LRS	1.00	1628																								X
LRS	1.00	1629																								X
CCV	1.00	1630																								X
CCB	1.00	1631																								X
ZZZZZZ	1.00	1632																								
PBS0721A	1.00	1633																								X
ZZZZZZ	1.00	1634																								
LCSS0721A	1.00	1635																								X
LCSDS0721A	1.00	1636																								X
ZZZZZZ	1.00	1637																								
ZZZZZZ	1.00	1638																								
ZZZZZZ	1.00	1638																								
MONU-WP-PLT-15	1.00	1639																								X
MONU-WP-PLT-14	1.00	1640																								X
CCV	1.00	1641																								X
CCB	1.00	1642																								X

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/22/03 End Date: 07/22/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1539																								X
S10	1.00	1540																								X
S30	1.00	1541																								X
S50	1.00	1542																								X
S100	1.00	1543																								X
S200	1.00	1544																								X
S300	1.00	1545																								X
ICV	1.00	1547																								X
ICB	1.00	1548																								X
LRS	1.00	1549																								X
LRS	1.00	1550																								X
CCV	1.00	1551																								X
CCB	1.00	1552																								X
ZZZZZZ	1.00	1553																								
PBS0722A	1.00	1553																								X
LCSS0722A	1.00	1554																								X
ZZZZZZ	1.00	1555																								
ZZZZZZ	1.00	1556																								
ZZZZZZ	1.00	1557																								
ZZZZZZ	1.00	1558																								
ZZZZZZ	1.00	1559																								
ZZZZZZ	1.00	1600																								
CENT-WP-PLT-31	1.00	1601																								X
CCV	1.00	1602																								X
CCB	1.00	1603																								X
TILL-WP-PLT-27	1.00	1604																								X
ZZZZZZ	1.00	1605																								
ZZZZZZ	1.00	1606																								
ZZZZZZ	1.00	1607																								
ZZZZZZ	1.00	1608																								
ZZZZZZ	1.00	1609																								
ZZZZZZ	1.00	1610																								
ZZZZZZ	1.00	1611																								
ZZZZZZ	1.00	1612																								
ZZZZZZ	1.00	1613																								
CCV	1.00	1614																								X
CCB	1.00	1615																								X

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/27/03 End Date: 07/27/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1809																								X
S10	1.00	1810																								X
S30	1.00	1811																								X
S50	1.00	1812																								X
S100	1.00	1813																								X
S200	1.00	1814																								X
S300	1.00	1815																								X
ICV	1.00	1816																								X
ICB	1.00	1817																								X
LRS	1.00	1818																								X
LRS	1.00	1819																								X
CCV	1.00	1820																								X
CCB	1.00	1821																								X
PBS0727A	1.00	1822																								X
LCSS0727A	1.00	1823																								X
SHERWPPLT23	1.00	1824																								X
SHERWPPLT23(100)	1.00	1825																								X
CAPMWPPLT20	1.00	1826																								X
GRANBGPLT35	1.00	1827																								X
GRANBGPLT34	1.00	1828																								X
GRANBGPLT36	1.00	1829																								X
GRANBGPLT36D	1.00	1830																								X
GRANBGPLT36S	1.00	1831																								X
CCV	1.00	1832																								X
CCB	1.00	1833																								X
ZZZZZZ	1.00	1834																								
ZZZZZZ	1.00	1835																								
ZZZZZZ	1.00	1836																								
ZZZZZZ	1.00	1837																								
ZZZZZZ	1.00	1838																								
ZZZZZZ	1.00	1839																								
ZZZZZZ	1.00	1840																								
ZZZZZZ	1.00	1841																								
ZZZZZZ	1.00	1842																								
ZZZZZZ	1.00	1843																								
CCV	1.00	1843																								X
CCB	1.00	1844																								X
ZZZZZZ	1.00	1845																								

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/27/03 End Date: 07/27/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1846																								
ZZZZZZ	1.00	1847																								
GRANBGPLT36A	1.00	1848																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 07/29/03 End Date: 07/29/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	2152																								X
S10	1.00	2153																								X
S30	1.00	2154																								X
S50	1.00	2155																								X
S100	1.00	2156																								X
S200	1.00	2157																								X
S300	1.00	2157																								X
ICV	1.00	2159																								X
ICB	1.00	2200																								X
LRS	1.00	2201																								X
LRS	1.00	2202																								X
CCV	1.00	2203																								X
CCB	1.00	2204																								X
PBS0729C	1.00	2205																								X
LCSS0729C	1.00	2206																								X
ZZZZZZ	1.00	2207																								
ZZZZZZ	1.00	2208																								
AJAXWPPLT08	1.00	2209																								X
AJAXPDPLT06	1.00	2210																								X
MAGNWPPLT14	1.00	2211																								X
MAGNPDPLT11	1.00	2212																								X
LUCABGPLT19	1.00	2213																								X
MAGNWPPLT17	1.00	2214																								X
CCV	1.00	2215																								X
CCB	1.00	2216																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 08/01/03 End Date: 08/01/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1707																								X
S10	1.00	1708																								X
S30	1.00	1709																								X
S50	1.00	1710																								X
S100	1.00	1711																								X
S200	1.00	1712																								X
S300	1.00	1713																								X
ICV	1.00	1715																								X
ICB	1.00	1716																								X
LRS	1.00	1717																								X
LRS	1.00	1718																								X
CCV	1.00	1719																								X
CCB	1.00	1720																								X
ZZZZZZ	1.00	1721																								
PBS0801B	1.00	1722																								X
LCS0801B	1.00	1723																								X
LCSD0801B	1.00	1724																								X
ZZZZZZ	1.00	1724																								
ZZZZZZ	1.00	1725																								
ZZZZZZ	1.00	1726																								
ZZZZZZ	1.00	1727																								
ZZZZZZ	1.00	1728																								
ZZZZZZ	1.00	1729																								
CCV	1.00	1730																								X
CCB	1.00	1731																								X
ZZZZZZ	1.00	1732																								
ZZZZZZ	1.00	1733																								
ZZZZZZ	1.00	1734																								
ZZZZZZ	1.00	1735																								
ZZZZZZ	1.00	1736																								
ZZZZZZ	1.00	1737																								
ZZZZZZ	1.00	1738																								
ZZZZZZ	1.00	1739																								
BLUEWPPLT20	1.00	1740																								X
BLUEWPPLT24	1.00	1741																								X
CCV	1.00	1742																								X
CCB	1.00	1743																								X
EBLK2	1.00	1744																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 08/01/03 End Date: 08/01/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1745																								
ZZZZZZ	1.00	1746																								
ZZZZZZ	1.00	1747																								
CCV	1.00	1748																								X
CCB	1.00	1749																								X

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0..	1.00	1510													X															
S	1.00	1515																												
S	1.00	1520													X															
S	1.00	1524																												
LRS	1.00	1529													X															
LRS	1.00	1534													X															
LRS	1.00	1539													X															
ICV	1.00	1545													X															
ICB	1.00	1550													X															
ICSA	1.00	1555													X															
ICSAB	1.00	1600													X															
CRI	1.00	1605													X															
CCV	1.00	1610													X															
CCB	1.00	1616													X															
ZZZZZZ	1.00	1621																												
ZZZZZZ	1.00	1626																												
ZZZZZZ	1.00	1631																												
ZZZZZZ	1.00	1636																												
ZZZZZZ	1.00	1641																												
ZZZZZZ	1.00	1646																												
ZZZZZZ	1.00	1651																												
ZZZZZZ	1.00	1656																												
ZZZZZZ	1.00	1701																												
ZZZZZZ	1.00	1706																												
CCV	1.00	1711													X															
CCB	1.00	1716													X															
ZZZZZZ	1.00	1722																												
ZZZZZZ	1.00	1727																												
ZZZZZZ	1.00	1732																												
ZZZZZZ	1.00	1737																												
ZZZZZZ	5.00	1742																												
ZZZZZZ	1.00	1747																												
ZZZZZZ	1.00	1752																												
ZZZZZZ	1.00	1757																												
ZZZZZZ	1.00	1802																												
ZZZZZZ	5.00	1807																												
CCV	1.00	1812													X															
CCB	1.00	1817													X															

USEPA-CLP FORMS

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1823																										
ZZZZZZ	1.00	1828																										
ZZZZZZ	1.00	1833																										
ZZZZZZ	1.00	1838																										
ZZZZZZ	1.00	1843																										
ZZZZZZ	1.00	1848																										
ZZZZZZ	1.00	1853																										
ZZZZZZ	1.00	1858																										
ZZZZZZ	1.00	1903																										
ZZZZZZ	1.00	1908																										
CCV	1.00	1913												X														
CCB	1.00	1918												X														
ZZZZZZ	1.00	1923																										
ZZZZZZ	1.00	1929																										
EBLK1	1.00	1934												X														
CAPMWPPLT20	1.00	1939												X														
GRANBGPLT34	1.00	1944												X														
GRANBGPLT36	1.00	1949												X														
GRANBGPLT36L	5.00	1954												X														
GRANBGPLT36A	1.00	1959												X														
GRANBGPLT36D	1.00	2004												X														
GRANBGPLT36S	1.00	2009												X														
CCV	1.00	2014												X														
CCB	1.00	2019												X														
ZZZZZZ	1.00	2024																										
ZZZZZZ	1.00	2029																										
ICSA	1.00	2035												X														
ICSAB	1.00	2040												X														
CRI	1.00	2045												X														
CCV	1.00	2050																										
CCB	1.00	2055																										

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 08/25/03 End Date: 08/25/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0700													X															
S	1.00	0704																												
S	1.00	0707													X															
S	1.00	0711																												
LRS	1.00	0716													X															
LRS	1.00	0720													X															
LRS	1.00	0724													X															
ICV	1.00	0728													X															
ICB	1.00	0732													X															
ICSA	1.00	0737													X															
ICSAB	1.00	0741													X															
CRI	1.00	0745													X															
CCV	1.00	0749													X															
CCB	1.00	0753													X															
BLUEWPPLT20	1.00	0757													X															
PBS0815C	1.00	0801													X															
ZZZZZZ	1.00	0806																												
ZZZZZZ	1.00	0810																												
ZZZZZZ	1.00	0814																												
ZZZZZZ	20.00	0818																												
ZZZZZZ	100.00	0822																												
ZZZZZZ	20.00	0826																												
ZZZZZZ	20.00	0830																												
CCV	1.00	0834													X															
CCB	1.00	0838													X															
ICSA	1.00	0842													X															
ICSAB	1.00	0846													X															
CRI	1.00	0850													X															
CCV	1.00	0855													X															
CCB	1.00	0859													X															

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 09/12/03 End Date: 09/12/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0917		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1.00	0922		X						X				X		X				X			X							
S	1.00	0925			X	X									X						X			X						
S	1.00	0929					X	X	X		X	X	X				X		X			X			X	X				
LRS	1.00	0934		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LRS	1.00	0939		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LRS	1.00	0944		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICV	1.00	0949		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICB	1.00	0953		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA	1.00	0958		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB	1.00	1003		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI	1.00	1008		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV	1.00	1012		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB	1.00	1017		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
PBS0807J	1.00	1022													X															
GRANBGPLT36L	5.00	1027		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ZZZZZZ	1.00	1031																												
ZZZZZZ	1.00	1036																												
ZZZZZZ	1.00	1041																												
MONU-WP-PLT-15	1.00	1045													X															
GRANBGPLT35	1.00	1050													X															
BLUEWPPLT24	1.00	1054													X															
CENT-WP-PLT-31	1.00	1059																			X									
CCV	1.00	1104		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB	1.00	1109		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LUCABGPLT19	1.00	1113																			X									
ZZZZZZ	1.00	1118																												
ICSA	1.00	1123		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB	1.00	1127		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI	1.00	1132		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV	1.00	1137		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB	1.00	1142		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 07/23/03 End Date: 07/23/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1428																X									
S0.2	1.00	1430																X									
S0.5	1.00	1432																X									
S1	1.00	1433																X									
S5	1.00	1435																X									
S10	1.00	1437																X									
ICV	1.00	1439																X									
ICB	1.00	1441																X									
CRA	1.00	1443																X									
CCV	1.00	1444																X									
CCB	1.00	1447																X									
PBS0721G	1.00	1448																X									
LCSS0721G	1.00	1450																X									
ZZZZZZ	100.00	1452																									
ZZZZZZ	100.00	1453																									
ZZZZZZ	100.00	1455																									
ZZZZZZ	100.00	1457																									
ZZZZZZ	100.00	1459																									
ZZZZZZ	100.00	1501																									
ZZZZZZ	100.00	1502																									
CCV	1.00	1504																X									
CCB	1.00	1506																X									

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 07/23/03 End Date: 07/23/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	
S0	1.00	1803																X									
S0.2	1.00	1805																X									
S0.5	1.00	1807																X									
S1	1.00	1809																X									
S5	1.00	1811																X									
S10	1.00	1813																X									
ICV	1.00	1815																X									
ICB	1.00	1817																X									
CRA	1.00	1819																X									
CCV	1.00	1820																X									
CCB	1.00	1822																X									
MONU-WP-PLT-15	1.00	1824																X									
MONU-WP-PLT-14	1.00	1826																X									
EBLK1	1.00	1828																X									
ZZZZZZ	1000.00	1829																									
ZZZZZZ	1.00	1831																									
ZZZZZZ	1.00	1833																									
ZZZZZZ	1.00	1835																									
ZZZZZZ	1.00	1837																									
ZZZZZZ	1.00	1838																									
CCV	1.00	1840																X									
CCB	1.00	1842																X									

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/04/03 End Date: 08/04/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1112																X								
S0.2	1.00	1114																X								
S0.5	1.00	1116																X								
S1	1.00	1117																X								
S5	1.00	1119																X								
S10	1.00	1121																X								
ICV	1.00	1123																X								
ICB	1.00	1125																X								
CRA	1.00	1126																X								
CCV	1.00	1128																X								
CCB	1.00	1130																X								
PBS0731A	1.00	1133																X								
LCSS0731A	1.00	1134																X								
ZZZZZZ	1.00	1136																								
ZZZZZZ	1.00	1138																								
ZZZZZZ	1.00	1140																								
ZZZZZZ	1.00	1142																								
ZZZZZZ	1.00	1144																								
SHERWPPLT23	1.00	1146																X								
SHERWPPLT23(100)	1.00	1148																X								
CCV	1.00	1150																X								
CCB	1.00	1152																X								
CAPMWPPLT20	1.00	1153																X								
GRANBGPLT35	1.00	1155																X								
GRANBGPLT34	1.00	1157																X								
GRANBGPLT36	1.00	1159																X								
GRANBGPLT36D	1.00	1201																X								
GRANBGPLT36S	1.00	1203																X								
ZZZZZZ	1.00	1205																								
ZZZZZZ	1.00	1207																								
ZZZZZZ	1.00	1208																								
CCV	1.00	1210																X								
CCB	1.00	1212																X								
ZZZZZZ	1.00	1214																								
ZZZZZZ	1.00	1216																								
ZZZZZZ	1.00	1218																								
ZZZZZZ	1.00	1220																								
ZZZZZZ	1.00	1222																								

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/04/03 End Date: 08/04/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1224																										
PBS0731B	1.00	1226																X										
LCSS0731B	1.00	1228																X										
ZZZZZZ	1.00	1230																										
CCV	1.00	1232																X										
CCB	1.00	1234																X										

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/04/03 End Date: 08/04/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1417																X									
S0.2	1.00	1419																X									
S0.5	1.00	1422																X									
S1	1.00	1423																X									
S5	1.00	1426																X									
S10	1.00	1428																X									
ICV	1.00	1430																X									
ICB	1.00	1432																X									
CRA	1.00	1434																X									
CCV	1.00	1435																X									
CCB	1.00	1437																X									
ZZZZZZ	100.00	1439																									
ZZZZZZ	100.00	1441																									
ZZZZZZ	100.00	1442																									
ZZZZZZ	100.00	1444																									
ZZZZZZ	100.00	1446																									
ZZZZZZ	100.00	1448																									
ZZZZZZ	100.00	1450																									
ZZZZZZ	1.00	1451																									
ZZZZZZ	100.00	1453																									
CCV	1.00	1455																X									
CCB	1.00	1457																X									
ZZZZZZ	100.00	1459																									
CENT-WP-PLT-31	1.00	1500																X									
TILL-WP-PLT-27	1.00	1502																X									
ZZZZZZ	1.00	1504																									
CCV	1.00	1506																X									
CCB	1.00	1508																X									

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1016																X								
S0.2	1.00	1018																X								
S0.5	1.00	1019																X								
S1	1.00	1021																X								
S5	1.00	1023																X								
S10	1.00	1025																X								
ICV	1.00	1027																X								
ICB	1.00	1029																X								
CRA	1.00	1031																X								
CCV	1.00	1033																X								
CCB	1.00	1035																X								
PBS0808B	1.00	1036																X								
LCSS0808B	1.00	1038																X								
ZZZZZZ	1.00	1040																								
ZZZZZZ	1.00	1042																								
ZZZZZZ	1.00	1044																								
ZZZZZZ	1.00	1046																								
AJAXWPPLT08	1.00	1048																X								
AJAXPDPLT06	1.00	1049																X								
MAGNWPPLT14	1.00	1051																X								
CCV	1.00	1053																X								
CCB	1.00	1055																X								
MAGNPDPLT11	1.00	1057																X								
LUCABGPLT19	1.00	1058																X								
MAGNWPPLT17	1.00	1100																X								
ZZZZZZ	1.00	1102																								
ZZZZZZ	1.00	1104																								
ZZZZZZ	1.00	1105																								
ZZZZZZ	1.00	1107																								
ZZZZZZ	1.00	1109																								
ZZZZZZ	1.00	1111																								
CCV	1.00	1113																X								
CCB	1.00	1115																X								

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1654																X									
S0.2	1.00	1656																X									
S0.5	1.00	1658																X									
S1	1.00	1700																X									
S5	1.00	1701																X									
S10	1.00	1703																X									
ICV	1.00	1705																X									
ICB	1.00	1707																X									
CRA	1.00	1709																X									
CCV	1.00	1710																X									
CCB	1.00	1712																X									
ZZZZZZ	2.00	1714																									
ZZZZZZ	1.00	1716																									
ZZZZZZ	5.00	1718																									
ZZZZZZ	1.00	1719																									
PBS0813B	1.00	1721																X									
LCSS0813B	1.00	1723																X									
ZZZZZZ	1.00	1725																									
ZZZZZZ	1.00	1727																									
ZZZZZZ	1.00	1728																									
CCV	1.00	1730																X									
CCB	1.00	1732																X									
ZZZZZZ	1.00	1734																									
ZZZZZZ	1.00	1736																									
ZZZZZZ	1.00	1737																									
ZZZZZZ	1.00	1739																									
ZZZZZZ	1.00	1741																									
ZZZZZZ	1.00	1743																									
ZZZZZZ	1.00	1745																									
ZZZZZZ	1.00	1746																									
ZZZZZZ	1.00	1749																									
CCV	1.00	1751																X									
CCB	1.00	1753																X									
ZZZZZZ	1.00	1755																									
ZZZZZZ	1.00	1757																									
ZZZZZZ	1.00	1759																									
ZZZZZZ	1.00	1801																									
ZZZZZZ	1.00	1802																									

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 08/14/03 End Date: 08/14/03

EPA Sample No.	D/F	Time	% R	Analytes																							
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
BLUEWPPLT20	1.00	1804																X								
BLUEWPPLT24	1.00	1806																X								
EBLK2	1.00	1808																X								
ZZZZZZ	1.00	1810																								
CCV	1.00	1811																X								
CCB	1.00	1813																X								

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0313		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1.00	0318		X						X				X		X				X			X						
S	1.00	0322			X	X									X						X			X					
S	1.00	0326					X	X	X		X	X	X				X		X			X			X	X			
LRS	1.00	0332		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LRS	1.00	0337		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LRS	1.00	0342		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICV	1.00	0347		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB	1.00	0352		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA	1.00	0357		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB	1.00	0403		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI	1.00	0408		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	0413		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	0418		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBS0807J	1.00	0423		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
LCSS0807J	1.00	0428		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
MONU-WP-PLT-15	1.00	0433		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
MONU-WP-PLT-14	1.00	0438		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
EBLK1	1.00	0444		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
CENT-WP-PLT-31	1.00	0449		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X			
TILL-WP-PLT-27	1.00	0454		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
SHERWPPLT23	1.00	0459		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
SHERWPPLT23(100)	1.00	0504		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CAPMWPPLT20	1.00	0509		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	0514		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	0519		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
GRANBGPLT35	1.00	0524		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
GRANBGPLT34	1.00	0529		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
GRANBGPLT36	1.00	0534		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X	X	X			
GRANBGPLT36L	5.00	0540																												
GRANBGPLT36A	1.00	0545		X	X	X	X	X	X		X	X	X	X			X		X		X	X		X	X	X			
GRANBGPLT36D	1.00	0550		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
GRANBGPLT36S	1.00	0555		X	X	X	X	X	X		X	X	X	X			X		X		X	X		X	X	X			
BLUEWPPLT20	1.00	0600		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
BLUEWPPLT24	1.00	0605		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
EBLK2	1.00	0610		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	0615		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	0620		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

USEPA-CLP FORMS

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCV001

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 08/21/03 End Date: 08/21/03

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN				
PBS0815C	1.00	0625		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
LCSS0815C	1.00	0630		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LCSDS0815C	1.00	0636		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
AJAXWPPLT08	1.00	0641		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
AJAXPDPLT06	1.00	0646		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MAGNWPPLT14	1.00	0651		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
MAGNPDPLT11	1.00	0656		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
LUCABGPLT19	1.00	0701		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X				
MAGNWPPLT17	1.00	0706		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV	1.00	0711		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB	1.00	0716		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSA	1.00	0721		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
ICSAB	1.00	0727		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CRI	1.00	0732		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCV	1.00	0737		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				
CCB	1.00	0742		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X				

STL Burlington
Colchester, Vermont

Sample Data Summary
Package

SDG: GCW003

SEVERN TRENT STL

September 9, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCW003

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 22, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94950		
535396	AJAXSTPWP04	07/17/03	Water
535397	AJAXSTPWP04F	07/17/03	Water
535398	AJAXSTSFW04	07/17/03	Water
535399	AJAXSTSFW04F	07/17/03	Water
535400	AJAXPDSFW06	07/17/03	Water
535401	AJAXPDSFW06F	07/17/03	Water
535402	AJAXADSFW07	07/17/03	Water
535403	AJAXADSFW07F	07/17/03	Water
535404	AJAXSTSFW52	07/17/03	Water
535405	AJAXSTSFW52F	07/17/03	Water
535406	GRANSTSFW54	07/17/03	Water
535407	GRANSTSFW54F	07/17/03	Water
535408	GRANSTSFW53	07/17/03	Water
535409	GRANSTSFW53F	07/17/03	Water
535410	MAGNSTSFW01	07/18/03	Water
535411	MAGNSTSFW01F	07/18/03	Water
535412	MAGNSTPWP01	07/18/03	Water
535413	MAGNSTPWP01F	07/18/03	Water
535414	MAGNSTSFW02	07/18/03	Water
535415	MAGNSTSFW02F	07/18/03	Water

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Severn Trent Laboratories, Inc.
STL Burlington • 208 South Park Drive, Suite 1, Colchester, VT 05446
Tel 802 655 1203 Fax 802 655 1248 • *www.stl-inc.com*

A part of Severn Trent plc

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal.

The analysis for arsenic speciation was performed by STL's North Canton facility, as approved by EA Engineering. STL North Canton assigned "Lot" numbers as samples were received. Though laboratory numbers may differ, the client's sample identifications were maintained. The results for this delivery group including a case narrative prepared by the North Canton laboratory are attached to this report.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Sulfate by 375.4
Please note that the due to instrumentation problems, sulfate was analyzed by Method 375.4 versus 300.0 as agreed to by the client.

Solids by 160.x
The analyses of all samples in this delivery group submitted for solids determinations (total, suspended, and / or dissolved) were performed one to two days beyond the method specified holding time of seven days. Samples were received with two days remaining in hold time and the laboratory analyzed all samples as quickly as was possible.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0412.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

0001 B LAST Alpha

Water p 1 of 2

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: Same
Address: 12011 Bel-Red Rd Bellevue, WA 98005	Address:
Contact: Jon Kindred	Contact:
Phone: 425-451-7400	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Sampler's Name: James Gaithever

Sampler's Signature:

Proj. No.: B590.13

Project Name: Granite Creek Watershed

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2]: VOA	A/G 1 Lt.	250 ml	P/O	Arsenic speciation	pH, redox, SO4 etc	TSS/TDS	TAL Metals - total	TAL Metals - dissolved	Cyanide	Lab/Sample ID (Lab Use Only)
W	7/17/03	1415		X	AJAX-ST-PWP-04	(0)	3	1	2	X				X	X	
W	7/17/03	1516		X	AJAX-ST-SFW-04		3	1	2	X	X	X	X	X	X	
W	7/17/03	1400		X	AJAX-PD-SFW-06		3	1	2	X	X	X	X	X	X	
W	7/17/03	1645		X	AJAX-AD-SFW-07		3	1	2	X	X	X	X	X	X	
W	7/17/03	1500		X	AJAX-ST-SFW-52		3	1	2	X	X	X	X	X	X	
W	7/17/03	1740		X	GRAN-ST-SFW-54		3	1	2	X	X	X	X	X	X	
W	7/17/03	1830		X	GRAN-ST-SFW-53		3	1	2	X	X	X	X	X	X	
W	7/18/03	1440		X	MAGN-ST-SFW-01		3	1	2	X	X	X	X	X	X	
W	7/18/03	0800		X	MAGN-ST-PWP-01		1	1	1	X				X	X	
W	7/18/03	1515		X	MAGN-ST-SFW-02		3	1	2	X	X	X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
[signature]	7-21-03	0900	[signature]	7/22/03	1020
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil

[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other 500 mL

STL cannot accept verbal changes.
Please Fax written changes to
(802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Geotechnical Analysis
Sample Data Summary Package

EASEAT GCW003

Oxidation-Reduction Potential

By ASTM 1498

Client:	EASEAT	**ETR(s):**	94950
Client Code:	EASEAT	**SDG(s):**	GCW003
Project:	23046	**Analyst(s):**	MRD
Job #:	N/A	**Start Date:**	17-Aug-03
Date Received:	22-Jul-03	**End Date:**	17-Aug-03

ORP Probe Calibration Check

Calibration Solution	ORP reading (mV)		Temp. (°C)
	Pre	Post	
100 mL pH 4 buffer + 1.0g Quinhydrone	297	295	18.5
100 mL pH 7 buffer + 1.0g Quinhydrone	123	121	18.5

Redox. Potential

Lab #	Sample ID	Temp. (°C)	Reading 1	Reading 2	ORP (mV)
535398	SFW04	16.0	151	153	**152.0**
535400	SFW06	16.0	164	165	**164.5**
535402	SFW07	16.0	170	169	**169.5**
535404	SFW52	16.0	184	184	**184.0**
535406	SFW54	16.0	182	180	**181.0**
535410	SFW01	16.0	164	164	**164.0**
535414	SFW02	16.0	169	166	**167.5**

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.

AJAXSTSFW04

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535398

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	307	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	224	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	260	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	3.1	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	137	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	137	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	5	25.0	58.6	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.1	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

AJAXPDSFW06

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535400

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	760	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	524	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	700	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	4.1	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	170	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	170	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	50	250	350	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.1	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
AJAXADSFW07

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCW003

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535402

Matrix: WATER
Client: EASEAT
Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	758	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	512	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	692	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	2	1.0	69.0	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	166	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	166	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	50	250	380	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.9	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

AJAXSTSFW52

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535404

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	761	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	524	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	733	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	2	0.77	36.0	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	9.7	
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	176	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	176	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	25	125	320	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.5	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

GRANSTSFW54

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535406

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	112	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	104	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	116	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	5.0	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	51.2	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	51.2	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	1	5.0	15.3	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.7	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNSTSFW01

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535410

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	215	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	260	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	169	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	0.90	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	142	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	142	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	1	5.0	5.2	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.0	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNSTSFW02

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW003

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535414

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	318	
130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	1	2.0	156	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	1	5.0	252	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	5.2	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	139	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	139	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	10	50.0	69.3	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.1	

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WET CHEMISTRY

Method Blank Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW003

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Conc.	Units	Qual.	DF	RL	Analytical Run Date	Analytical Batch
BLKAL0728A	310.1	Hydroxide Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Carbonate Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Bicarbonate Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Total Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKDS0726A	160.1	Total Dissolved Solids	5.0	mg/L	U	1	5.0	07/26/03	BLKDS0726A
BLKDS0726B	160.1	Total Dissolved Solids	5.0	mg/L	U	1	5.0	07/26/03	BLKDS0726B
BLKHA0731A	130.2	Total Hardness as CaCO3	2.0	mg/L	U	1	2.0	07/31/03	BLKHA0731A
BLKSS0725A	160.2	Total Suspended Solids	0.50	mg/L	U	1	0.50	07/25/03	BLKSS0725A
BLKSU0811A	375.4	Sulfate	5.0	mg/L	U	1	5.0	08/11/03	BLKSU0811A

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WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW003

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCS DS0726A	160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	50.0	50.0	100.0
LCS DS0726B	160.1	Total Dissolved Solids	07/26/03	BLKDS0726B	mg/L	51.0	50.0	102.0
LCSAL0728A	310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	58.8	54.7000	107.5
LCSAL0728A	310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	58.8	54.7000	107.5
LCSAL0728A	310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	58.8	54.7000	107.5
LCSAL0728A	310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	58.8	54.7000	107.5
LCSCD0725A	120.1	Conductivity (umhos/cm)	07/25/03		umhos/c	930	977.0000	95.2
LCSHA0731A	130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	124	121.0000	102.5
LCSPH0725A	9040B	Corrosivity by pH	07/25/03		pH Units	6.0	6.0000	100.0
LCSSS0725A	160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	502	500	100.4
LCSSU0811A	375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	9.6	10.0	96.0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

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WET CHEMISTRY

Laboratory Control Sample Duplicate
Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW003

Lab Code: STLVT **Case No.:** 23046

Matrix: SOIL **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCSD Conc.	True Value	% Recovery*	RPD**
LCSDCD0725A	120.1	Conductivity (umhos/cm)	07/25/03		umhos/c	958	977.0000	98.1	3
LCSDHA0731A	130.2	Total Hardness as CaCO3	07/31/03	BLKHA0731A	mg/L	124	121.0000	102.5	0
LCSDPH0725A	9040B	Corrosivity by pH	07/25/03		pH Units	6.0	6.0000	100.2	0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*
*** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/05/03 02:05 PM

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Sample Data Summary Package For Metals

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
AJAXADSFW07	535402
AJAXADSFW07F	535403
AJAXPDSFW06	535400
AJAXPDSFW06F	535401
AJAXSTPWP04	535396
AJAXSTPWP04F	535397
AJAXSTSFW04	535398
AJAXSTSFW04F	535399
AJAXSTSFW52	535404
AJAXSTSFW52F	535405
GRANSTSFW54	535406
GRANSTSFW54F	535407
MAGNSTPWP01	535412
MAGNSTPWP01F	535413
MAGNSTSFW01	535410
MAGNSTSFW01F	535411
MAGNSTSFW02	535414
MAGNSTSFW02F	535415

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXADSFW07

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535402

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	27.7	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.6	B		P
7440-39-3	Barium	12.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	105000			P
7440-47-3	Chromium	3.0	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	16.8	U		P
7439-92-1	Lead	1.6	B		P
7439-95-4	Magnesium	58000			P
7439-96-5	Manganese	215			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	9.9	B		P
7440-09-7	Potassium	3460	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5170			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXADSFW07F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535403

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	907			P
7440-36-0	Antimony	4.5	B		P
7440-38-2	Arsenic	41.9			P
7440-39-3	Barium	29.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	109000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	13.3	B		P
7440-50-8	Copper	10.3	B		P
7439-89-6	Iron	10500			P
7439-92-1	Lead	4.4			P
7439-95-4	Magnesium	59500			P
7439-96-5	Manganese	1590			P
7439-97-6	Mercury	0.48			CV
7440-02-0	Nickel	41.6			P
7440-09-7	Potassium	3860	B		P
7782-49-2	Selenium	1.8	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5200			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	B		P
7440-66-6	Zinc	83.0			P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXPDSFW06

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535400

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	56.5	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	5.4	B		P
7440-39-3	Barium	10.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	107000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	3.0	B		P
7439-89-6	Iron	765			P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	58800			P
7439-96-5	Manganese	154			P
7439-97-6	Mercury	0.12	B		CV
7440-02-0	Nickel	6.9	B		P
7440-09-7	Potassium	3530	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5230			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	11.9	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXPDSFW06F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535401

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	30.6	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	9.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	106000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	16.8	U		P
7439-92-1	Lead	2.3	B		P
7439-95-4	Magnesium	58400			P
7439-96-5	Manganese	95.9			P
7439-97-6	Mercury	0.12	B		CV
7440-02-0	Nickel	5.0	B		P
7440-09-7	Potassium	3480	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5240			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTPWP04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535396

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTPWP04F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535397

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	28.0	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	11.5			P
7440-39-3	Barium	84.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	44200			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	34.9	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	20000			P
7439-96-5	Manganese	15.2			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2480	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	7420			P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	5.0	B		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTSFW04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535398

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	48.1	B		P
7440-36-0	Antimony	4.2	B		P
7440-38-2	Arsenic	23.6			P
7440-39-3	Barium	69.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	40600			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	151			P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	18600			P
7439-96-5	Manganese	12.8	B		P
7439-97-6	Mercury	0.15	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2570	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6480			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
AJAXSTSFW04F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535399

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	28.2	B		P
7440-36-0	Antimony	4.2	B		P
7440-38-2	Arsenic	22.9			P
7440-39-3	Barium	70.2	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	41000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	2.1	B		P
7439-89-6	Iron	90.2	B		P
7439-92-1	Lead	2.0	B		P
7439-95-4	Magnesium	18800			P
7439-96-5	Manganese	8.6	B		P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2530	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6700			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.5	B		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTSFW52

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535404

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.8	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	47.3			P
7440-39-3	Barium	33.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	107000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	31.1	B		P
7439-92-1	Lead	1.7	B		P
7439-95-4	Magnesium	56500			P
7439-96-5	Manganese	362			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	4520	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5450			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

AJAXSTSFW52F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535405

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	83.1	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	63.6			P
7440-39-3	Barium	26.7	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	111000			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	1230			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	58800			P
7439-96-5	Manganese	136			P
7439-97-6	Mercury	0.16	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	4440	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	5420			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	7.5	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTSFW54

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535406

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	54.1	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	12.6			P
7440-39-3	Barium	53.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	16200			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	78.1	B		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	4120	B		P
7439-96-5	Manganese	15.0			P
7439-97-6	Mercury	0.14	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2530	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	3490	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTSFW54F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535407

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	26.4	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	9.6	B		P
7440-39-3	Barium	51.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	15900			P
7440-47-3	Chromium	0.74	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	32.3	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	4040	B		P
7439-96-5	Manganese	6.7	B		P
7439-97-6	Mercury	0.10	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2490	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	3650	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP01

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535412

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP01F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535413

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	60.7	B		P
7440-36-0	Antimony	3.8	U		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	74.4	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	29200			P
7440-47-3	Chromium	2.1	B		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	40.4	B		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	12500			P
7439-96-5	Manganese	4.0	B		P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2150	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6550			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTSFW01

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535410

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	51.8	B		P
7440-36-0	Antimony	4.4	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	56.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	28400			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	57.1	B		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	12900			P
7439-96-5	Manganese	4.8	B		P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2320	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6570			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.4	B		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTSFW01F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535411

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	30.2	B		P
7440-36-0	Antimony	4.1	B		P
7440-38-2	Arsenic	2.4	U		P
7440-39-3	Barium	55.2	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	28200			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	38.8	B		P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	12800			P
7439-96-5	Manganese	3.3	B		P
7439-97-6	Mercury	0.10	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2420	B		P
7782-49-2	Selenium	2.4	B		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6480			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

USEPA - CLP
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNSTSFW02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535414

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	60.0	B		P
7440-36-0	Antimony	4.9	B		P
7440-38-2	Arsenic	36.2			P
7440-39-3	Barium	65.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	40900			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	464			P
7439-92-1	Lead	1.7	B		P
7439-95-4	Magnesium	18700			P
7439-96-5	Manganese	28.0			P
7439-97-6	Mercury	0.18	B		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2790	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6300			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTSFW02F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Lab Sample ID: 535415

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	29.1	B		P
7440-36-0	Antimony	5.6	B		P
7440-38-2	Arsenic	29.7			P
7440-39-3	Barium	62.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.30	U		P
7440-70-2	Calcium	40500			P
7440-47-3	Chromium	0.60	U		P
7440-48-4	Cobalt	1.8	U		P
7440-50-8	Copper	1.4	U		P
7439-89-6	Iron	102			P
7439-92-1	Lead	1.5	U		P
7439-95-4	Magnesium	18500			P
7439-96-5	Manganese	21.2			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.0	U		P
7440-09-7	Potassium	2780	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	0.90	U		P
7440-23-5	Sodium	6230			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.2	U		P
7440-66-6	Zinc	5.7	U		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	1070.00	107.0	400.0	390.80	97.7	433.40	108.4	P
Mercury	3.0	3.09	103.0	5.0	4.98	99.6	4.87	97.4	CV
Cyanide	120.0	113.99	95.0	150.0	144.40	96.3	149.38	99.6	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Lead				400.0	431.50	107.9	430.70	107.7	P
Mercury				5.0	4.61	92.2	4.73	94.6	CV
Cyanide				150.0	153.09	102.1	151.26	100.8	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26760.00	102.9	30200.0	29200.00	96.7	29630.00	98.1	P
Antimony	250.0	254.70	101.9	300.0	301.50	100.5	300.10	100.0	P
Arsenic	250.0	259.60	103.8	100.0	100.90	100.9	101.60	101.6	P
Barium	500.0	505.30	101.1	200.0	192.10	96.0	194.40	97.2	P
Beryllium	500.0	512.00	102.4	100.0	95.85	95.8	96.00	96.0	P
Cadmium	500.0	500.20	100.0	100.0	94.54	94.5	94.92	94.9	P
Calcium	25000.0	25570.00	102.3	30200.0	28950.00	95.9	29030.00	96.1	P
Chromium	500.0	507.00	101.4	200.0	190.90	95.4	192.00	96.0	P
Cobalt	500.0	501.70	100.3	200.0	193.10	96.6	195.40	97.7	P
Copper	500.0	514.70	102.9	200.0	195.80	97.9	198.30	99.2	P
Iron	25500.0	26060.00	102.2	30200.0	28820.00	95.4	28510.00	94.4	P
Magnesium	25000.0	25270.00	101.1	30200.0	28930.00	95.8	29070.00	96.3	P
Manganese	500.0	502.70	100.5	200.0	191.20	95.6	192.20	96.1	P
Nickel	500.0	506.80	101.4	200.0	192.00	96.0	194.50	97.2	P
Potassium	25000.0	26850.00	107.4	30200.0	30710.00	101.7	31270.00	103.5	P
Selenium	250.0	251.70	100.7	100.0	99.13	99.1	99.85	99.8	P
Silver	500.0	505.00	101.0	100.0	98.79	98.8	100.00	100.0	P
Sodium	25000.0	25260.00	101.0	30200.0	28670.00	94.9	29320.00	97.1	P
Thallium	250.0	247.60	99.0	100.0	94.81	94.8	96.47	96.5	P
Vanadium	500.0	503.70	100.7	200.0	189.80	94.9	192.10	96.0	P
Zinc	500.0	502.70	100.5	200.0	195.60	97.8	190.10	95.0	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	29150.00	96.5	29330.00	97.1	P
Antimony				300.0	302.60	100.9	299.90	100.0	P
Arsenic				100.0	100.30	100.3	99.99	100.0	P
Barium				200.0	193.90	97.0	192.00	96.0	P
Beryllium				100.0	97.14	97.1	94.30	94.3	P
Cadmium				100.0	96.79	96.8	94.26	94.3	P
Calcium				30200.0	29440.00	97.5	28750.00	95.2	P
Chromium				200.0	195.00	97.5	190.50	95.2	P
Cobalt				200.0	198.50	99.2	194.00	97.0	P
Copper				200.0	195.90	98.0	195.00	97.5	P
Iron				30200.0	28540.00	94.5	27610.00	91.4	P
Magnesium				30200.0	29380.00	97.3	28840.00	95.5	P
Manganese				200.0	193.80	96.9	189.30	94.6	P
Nickel				200.0	197.20	98.6	192.40	96.2	P
Potassium				30200.0	31070.00	102.9	30920.00	102.4	P
Selenium				100.0	100.20	100.2	98.45	98.4	P
Silver				100.0	99.90	99.9	99.13	99.1	P
Sodium				30200.0	28750.00	95.2	29030.00	96.1	P
Thallium				100.0	97.81	97.8	95.22	95.2	P
Vanadium				200.0	192.50	96.2	189.40	94.7	P
Zinc				200.0	194.10	97.0	186.50	93.2	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26170.00	100.7	30200.0	30260.00	100.2	30190.00	100.0	P
Antimony	250.0	251.50	100.6	300.0	305.50	101.8	306.30	102.1	P
Arsenic	250.0	245.00	98.0	100.0	100.10	100.1	100.30	100.3	P
Barium	500.0	495.30	99.1	200.0	201.20	100.6	200.80	100.4	P
Beryllium	500.0	501.70	100.3	100.0	99.17	99.2	100.70	100.7	P
Cadmium	500.0	492.70	98.5	100.0	98.33	98.3	100.30	100.3	P
Calcium	25000.0	25420.00	101.7	30200.0	30230.00	100.1	30630.00	101.4	P
Chromium	500.0	501.60	100.3	200.0	198.20	99.1	200.00	100.0	P
Cobalt	500.0	491.80	98.4	200.0	198.90	99.4	201.10	100.6	P
Copper	500.0	502.30	100.5	200.0	203.00	101.5	203.20	101.6	P
Iron	25500.0	26220.00	102.8	30200.0	30220.00	100.1	30550.00	101.2	P
Lead	1000.0	984.80	98.5	400.0	392.20	98.0	397.90	99.5	P
Magnesium	25000.0	25360.00	101.4	30200.0	30000.00	99.3	30470.00	100.9	P
Manganese	500.0	494.80	99.0	200.0	199.00	99.5	201.00	100.5	P
Nickel	500.0	497.10	99.4	200.0	195.60	97.8	197.40	98.7	P
Potassium	25000.0	26390.00	105.6	30200.0	31300.00	103.6	31120.00	103.0	P
Selenium	250.0	241.30	96.5	100.0	99.90	99.9	102.30	102.3	P
Silver	500.0	499.90	100.0	100.0	101.10	101.1	100.70	100.7	P
Sodium	25000.0	24940.00	99.8	30200.0	29690.00	98.3	29470.00	97.6	P
Thallium	250.0	233.70	93.5	100.0	98.20	98.2	100.70	100.7	P
Vanadium	500.0	495.40	99.1	200.0	199.30	99.6	201.30	100.6	P
Zinc	500.0	498.40	99.7	200.0	200.30	100.2	201.80	100.9	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum				30200.0	30870.00	102.2	30230.00	100.1	P
Antimony				300.0	310.20	103.4	302.90	101.0	P
Arsenic				100.0	102.90	102.9	99.10	99.1	P
Barium				200.0	205.30	102.6	200.40	100.2	P
Beryllium				100.0	101.70	101.7	99.53	99.5	P
Cadmium				100.0	101.00	101.0	98.60	98.6	P
Calcium				30200.0	30800.00	102.0	30180.00	99.9	P
Chromium				200.0	201.90	101.0	197.60	98.8	P
Cobalt				200.0	202.40	101.2	197.90	99.0	P
Copper				200.0	207.40	103.7	202.70	101.4	P
Iron				30200.0	30870.00	102.2	30200.00	100.0	P
Lead				400.0	395.00	98.8	389.80	97.4	P
Magnesium				30200.0	30630.00	101.4	29960.00	99.2	P
Manganese				200.0	203.40	101.7	199.00	99.5	P
Nickel				200.0	198.70	99.4	194.80	97.4	P
Potassium				30200.0	31710.00	105.0	31040.00	102.8	P
Selenium				100.0	99.83	99.8	100.50	100.5	P
Silver				100.0	102.70	102.7	101.30	101.3	P
Sodium				30200.0	29870.00	98.9	29570.00	97.9	P
Thallium				100.0	97.74	97.7	95.03	95.0	P
Vanadium				200.0	204.30	102.2	199.00	99.5	P
Zinc				200.0	205.00	102.5	200.40	100.2	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Lead				6.0	9.03	150.5	7.39	123.2
Mercury	0.2	0.30	150.0					

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	497.90	124.5	551.10	137.8
Antimony				120.0	120.10	100.1	122.00	101.7
Arsenic				20.0	20.28	101.4	21.79	109.0
Barium				400.0	382.80	95.7	381.10	95.3
Beryllium				10.0	9.90	99.0	9.92	99.2
Cadmium				10.0	9.86	98.6	9.94	99.4
Calcium				10000.0	10100.00	101.0	10100.00	101.0
Chromium				20.0	19.43	97.2	21.57	107.8
Cobalt				100.0	95.36	95.4	96.07	96.1
Copper				50.0	48.37	96.7	47.38	94.8
Iron				200.0	244.40	122.2	249.30	124.6
Magnesium				10000.0	9866.00	98.7	9916.00	99.2
Manganese				30.0	28.89	96.3	28.67	95.6
Nickel				80.0	78.34	97.9	79.29	99.1
Potassium				10000.0	11430.00	114.3	11530.00	115.3
Selenium				10.0	10.16	101.6	12.43	124.3
Silver				20.0	19.50	97.5	19.50	97.5
Sodium				10000.0	9488.00	94.9	9581.00	95.8
Thallium				20.0	20.61	103.0	17.28	86.4
Vanadium				100.0	96.35	96.4	96.57	96.6
Zinc				40.0	41.24	103.1	38.18	95.4

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	472.90	118.2	484.10	121.0
Antimony				120.0	124.00	103.3	124.70	103.9
Arsenic				20.0	20.22	101.1	20.70	103.5
Barium				400.0	393.80	98.4	393.10	98.3
Beryllium				10.0	10.11	101.1	10.15	101.5
Cadmium				10.0	10.10	101.0	10.00	100.0
Calcium				10000.0	10420.00	104.2	10410.00	104.1
Chromium				20.0	21.06	105.3	21.12	105.6
Cobalt				100.0	98.58	98.6	97.19	97.2
Copper				50.0	50.31	100.6	50.36	100.7
Iron				200.0	244.40	122.2	260.60	130.3
Lead				6.0	4.15	69.2	4.18	69.7
Magnesium				10000.0	10150.00	101.5	10130.00	101.3
Manganese				30.0	29.92	99.7	29.81	99.4
Nickel				80.0	79.22	99.0	78.70	98.4
Potassium				10000.0	10780.00	107.8	10760.00	107.6
Selenium				10.0	8.45	84.5	7.99	79.9
Silver				20.0	20.79	104.0	19.79	99.0
Sodium				10000.0	9837.00	98.4	9716.00	97.2
Thallium				20.0	22.85	114.2	19.75	98.8
Vanadium				100.0	99.45	99.4	98.11	98.1
Zinc				40.0	41.49	103.7	41.64	104.1

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum									18.300	U	P
Antimony									3.800	U	P
Arsenic									2.400	U	P
Barium									7.300	U	P
Beryllium									0.200	U	P
Cadmium									0.300	U	P
Calcium									223.200	U	P
Chromium									0.600	U	P
Cobalt									1.800	U	P
Copper									1.400	U	P
Iron									16.800	U	P
Lead	1.7	B	1.5	U	2.1	B	2.4	B	2.095	B	P
Magnesium									181.700	U	P
Manganese									0.700	U	P
Mercury	0.1	B	0.1	U	0.1	U	0.1	U	0.140	B	CV
Nickel									2.000	U	P
Potassium									250.000	U	P
Selenium									1.700	U	P
Silver									0.900	U	P
Sodium									218.800	U	P
Thallium									-6.031	B	P
Vanadium									2.200	U	P
Zinc									5.700	U	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	AS

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead			2.3	B							P
Mercury			0.2	B							CV
Cyanide			10.0	U							AS

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	32.0	B	18.3	U	18.3	U	34.8	B			P
Antimony	3.8	U	3.8	U	3.8	U	3.8	U			P
Arsenic	2.4	U	2.4	U	2.4	U	2.4	U			P
Barium	7.3	U	7.3	U	7.3	U	7.3	U			P
Beryllium	0.5	B	0.2	U	0.3	B	0.2	U			P
Cadmium	0.5	B	0.3	U	0.3	U	0.3	U			P
Calcium	223.2	U	223.2	U	223.2	U	223.2	U			P
Chromium	0.6	U	0.6	U	-1.1	B	0.6	U			P
Cobalt	1.8	U	1.8	U	1.8	U	1.8	U			P
Copper	1.4	U	1.4	U	1.4	U	1.4	U			P
Iron	20.6	B	16.8	U	-20.2	B	16.8	U			P
Magnesium	181.7	U	181.7	U	181.7	U	181.7	U			P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Nickel	2.0	U	2.0	U	2.0	U	2.0	U			P
Potassium	281.3	B	355.3	B	250.8	B	664.4	B			P
Selenium	1.7	U	1.7	B	1.7	U	1.7	U			P
Silver	0.9	U	0.9	U	0.9	U	0.9	U			P
Sodium	218.8	U	218.8	U	218.8	U	218.8	U			P
Thallium	2.8	U	2.8	U	2.8	U	-4.2	B			P
Vanadium	2.2	U	2.2	U	2.2	U	2.2	U			P
Zinc	5.7	U	5.7	U	5.7	U	5.7	U			P

USEPA - CLP

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BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			49.2	B							P
Antimony			3.8	U							P
Arsenic			2.4	U							P
Barium			7.3	U							P
Beryllium			0.2	U							P
Cadmium			0.3	U							P
Calcium			223.2	U							P
Chromium			0.6	U							P
Cobalt			1.8	U							P
Copper			1.4	U							P
Iron			21.2	B							P
Magnesium			181.7	U							P
Manganese			0.7	U							P
Nickel			2.0	U							P
Potassium			376.8	B							P
Selenium			2.1	B							P
Silver			0.9	U							P
Sodium			218.8	U							P
Thallium			2.8	U							P
Vanadium			2.2	U							P
Zinc			5.7	U							P

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	23.6	U			P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U			P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U			P
Barium	5.9	U	5.9	U	5.9	U	5.9	U			P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U			P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U			P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U			P
Chromium	1.4	U	1.4	U	1.4	U	1.4	U			P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U			P
Copper	2.4	U	2.4	U	2.4	U	2.4	U			P
Iron	33.3	U	33.3	U	33.3	U	33.3	U			P
Lead	1.3	U	1.3	U	-2.7	B	-1.3	B			P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U			P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U			P
Nickel	2.1	U	2.1	U	2.1	U	2.1	U			P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U			P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U			P
Silver	2.2	U	2.2	U	2.2	U	2.2	U			P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U			P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U			P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U			P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U			P

USEPA - CLP

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BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			23.6	U							P
Antimony			4.7	U							P
Arsenic			4.8	U							P
Barium			5.9	U							P
Beryllium			0.2	U							P
Cadmium			0.6	U							P
Calcium			182.1	U							P
Chromium			1.4	U							P
Cobalt			2.0	U							P
Copper			2.4	U							P
Iron			33.3	U							P
Lead			1.3	U							P
Magnesium			178.3	U							P
Manganese			0.7	U							P
Nickel			2.1	U							P
Potassium			393.0	U							P
Selenium			3.4	U							P
Silver			2.2	U							P
Sodium			472.7	U							P
Thallium			5.7	U							P
Vanadium			2.0	U							P
Zinc			1.0	U							P

USEPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	44	-3	44.2	100.5	3	50.7	115.2

USEPA - CLP

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	452460	486700	488400.0	107.9	485500	491600.0	108.7
Antimony	0	572	4	642.2	112.3	12	636.5	111.3
Arsenic	0	94	5	105.7	112.4	1	108.6	115.5
Barium	0	466	1	495.3	106.3	2	499.6	107.2
Beryllium	0	446	0	484.1	108.5	0	480.0	107.6
Cadmium	0	874	2	952.1	108.9	2	955.4	109.3
Calcium	500000	421280	463300	468600.0	111.2	462100	468600.0	111.2
Chromium	0	436	4	476.9	109.4	5	479.5	110.0
Cobalt	0	435	8	471.5	108.4	8	476.6	109.6
Copper	0	473	3	515.6	109.0	3	518.7	109.7
Iron	200000	172540	194400	195100.0	113.1	186700	187700.0	108.8
Magnesium	500000	498160	533200	543900.0	109.2	534600	544700.0	109.3
Manganese	0	428	0	469.3	109.6	0	468.0	109.3
Nickel	0	877	11	961.7	109.7	12	968.0	110.4
Potassium	0	0	434	491.4		516	580.5	
Selenium	0	48	-7	46.7	97.3	-9	40.5	84.4
Silver	0	196	0	213.2	108.8	1	215.5	109.9
Sodium	0	0	-252	-448.7		-302	-401.1	
Thallium	0	95	3	99.8	105.1	0	96.3	101.4
Vanadium	0	417	-2	454.1	108.9	-1	458.1	109.9
Zinc	0	841	8	961.1	114.3	7	937.3	111.5

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ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	504500	502300.0	104.1	514500	509400.0	105.5
Antimony	0	596	0	614.4	103.1	3	622.3	104.4
Arsenic	0	102	7	106.0	103.9	4	108.8	106.7
Barium	0	503	2	508.0	101.0	2	511.9	101.8
Beryllium	0	482	0	483.7	100.4	-1	496.9	103.1
Cadmium	0	938	1	939.5	100.2	1	967.7	103.2
Calcium	500000	477840	494300	492300.0	103.0	506100	504600.0	105.6
Chromium	0	483	3	482.9	100.0	4	492.4	101.9
Cobalt	0	457	-1	462.4	101.2	-1	470.8	103.0
Copper	0	526	4	521.1	99.1	3	526.8	100.2
Iron	200000	191980	202000	198700.0	103.5	206900	203300.0	105.9
Lead	0	49	2	46.1	94.1	0	47.0	95.9
Magnesium	500000	521880	541000	539600.0	103.4	554900	552900.0	105.9
Manganese	0	474	1	477.0	100.6	1	487.1	102.8
Nickel	0	952	-1	955.1	100.3	-1	976.9	102.6
Potassium	0	0	46	10.0		141	121.2	
Selenium	0	47	3	51.0	108.5	0	48.5	103.2
Silver	0	213	1	216.4	101.6	1	219.2	102.9
Sodium	0	0	-273	-305.2		-242	-161.8	
Thallium	0	89	-7	92.3	103.7	1	90.6	101.8
Vanadium	0	478	0	472.7	98.9	0	481.3	100.7
Zinc	0	998	5	1009.0	101.1	5	1029.0	103.1

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	51000.0	49630.00	97.3						
Antimony	2000.0	1984.00	99.2						
Arsenic	1050.0	1019.00	97.0						
Barium	500.0	474.10	94.8						
Beryllium	500.0	468.80	93.8						
Cadmium	525.0	482.20	91.8						
Calcium	50000.0	47290.00	94.6						
Chromium	500.0	470.90	94.2						
Cobalt	500.0	466.10	93.2						
Copper	500.0	491.50	98.3						
Iron	50500.0	47490.00	94.0						
Lead	1015.0	1023.00	100.8						
Magnesium	50000.0	47210.00	94.4						
Manganese	500.0	465.40	93.1						
Mercury	1.0	1.03	103.0						
Nickel	500.0	464.60	92.9						
Potassium	50000.0	48340.00	96.7						
Selenium	525.0	495.30	94.3						
Silver	500.0	399.30	79.9						
Sodium	50000.0	49250.00	98.5						
Thallium	550.0	514.10	93.5						
Vanadium	500.0	468.20	93.6						
Zinc	500.0	462.70	92.5						
Cyanide	120.0	114.44	95.4						

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	51000.0	49940.00	97.9					
Antimony	2000.0	1999.00	100.0					
Arsenic	1050.0	1030.00	98.1					
Barium	500.0	475.80	95.2					
Beryllium	500.0	474.00	94.8					
Cadmium	525.0	488.60	93.1					
Calcium	50000.0	47870.00	95.7					
Chromium	500.0	476.40	95.3					
Cobalt	500.0	472.00	94.4					
Copper	500.0	493.00	98.6					
Iron	50500.0	48030.00	95.1					
Lead	1015.0	1036.00	102.1					
Magnesium	50000.0	47800.00	95.6					
Manganese	500.0	470.10	94.0					
Mercury	1.0	0.96	96.0					
Nickel	500.0	472.00	94.4					
Potassium	50000.0	48460.00	96.9					
Selenium	525.0	496.90	94.6					
Silver	500.0	401.80	80.4					
Sodium	50000.0	49740.00	99.5					
Thallium	550.0	519.30	94.4					
Vanadium	500.0	473.20	94.6					
Zinc	500.0	466.90	93.4					
Cyanide	120.0	131.67	109.7					

9
ICP SERIAL DILUTIONS

SAMPLE NO.

AJAXSTPWP04FL

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	28.02	B	118.00	U	100.0		P
Antimony	4.70	U	23.50	U			P
Arsenic	11.47		24.00	U	100.0		P
Barium	84.13	B	83.50	B	0.7		P
Beryllium	0.20	U	1.00	U			P
Cadmium	0.60	U	3.00	U			P
Calcium	44160.00		44670.00		1.2		P
Chromium	1.40	U	7.00	U			P
Cobalt	2.00	U	10.00	U			P
Copper	2.40	U	12.00	U			P
Iron	34.91	B	166.50	U	100.0		P
Lead	1.30	U	6.50	U			P
Magnesium	20010.00		20210.00	B	1.0		P
Manganese	15.16		14.95	B	1.4		P
Nickel	2.10	U	10.50	U			P
Potassium	2483.00	B	2596.00	B	4.6		P
Selenium	3.40	U	17.00	U			P
Silver	2.20	U	11.00	U			P
Sodium	7418.00		6821.00	B	8.0		P
Thallium	5.70	U	28.50	U			P
Vanadium	2.00	U	10.00	U			P
Zinc	4.98	B	8.30	B	66.7		P

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: Date: 7/1/2003

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: Date: 7/1/2003

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments:

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INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Iron	271.441		100	33.3	P
Lead	220.353		3	1.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Selenium	196.026		5	3.4	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Thallium	190.864		10	5.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments: _____

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Lead	220.353		3	1.5	P

Comments:

USEPA - CLP

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	18.3	P
Antimony	206.838		60	3.8	P
Arsenic	189.042		10	2.4	P
Barium	493.409		200	7.3	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.3	P
Calcium	317.933		5000	223.2	P
Chromium	267.716		10	0.6	P
Cobalt	228.616		50	1.8	P
Copper	324.754		25	1.4	P
Iron	271.441		100	16.8	P
Magnesium	279.079		5000	181.7	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.0	P
Potassium	766.491		5000	250.0	P
Selenium	196.026		5	1.7	P
Silver	328.068		10	0.9	P
Sodium	330.232		5000	218.8	P
Thallium	190.864		10	2.8	P
Vanadium	292.402		50	2.2	P
Zinc	206.200		20	5.7	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

USEPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Iron	10.00	1000000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments: _____

USEPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Lead	10.00	50000.0	P

Comments: _____

_____

_____

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12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	100000.0	P
Iron	10.00	1000000.0	P
Magnesium	10.00	600000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	50000.0	P
Potassium	10.00	100000.0	P
Selenium	10.00	5000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Thallium	10.00	5000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	10000.0	P

Comments: _____

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXADSFW07	7/30/2003	50.0	50.0
AJAXPDSFW06	7/30/2003	50.0	50.0
AJAXSTPWP04	7/30/2003	50.0	50.0
AJAXSTSFW04	7/30/2003	50.0	50.0
AJAXSTSFW52	7/30/2003	50.0	50.0
GRANSTSFW54	7/30/2003	50.0	50.0
ICV	7/30/2003	50.0	50.0
LCS0730B	7/30/2003	50.0	50.0
LCSD0730B	7/30/2003	50.0	50.0
MAGNSTPWP01	7/30/2003	50.0	50.0
MAGNSTSFW01	7/30/2003	50.0	50.0
MAGNSTSFW02	7/30/2003	50.0	50.0
PBW0730B	7/30/2003	50.0	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXADSFW07	8/5/2003	100.0	100.0
AJAXADSFW07F	8/5/2003	100.0	100.0
AJAXPDSFW06	8/5/2003	100.0	100.0
AJAXPDSFW06F	8/5/2003	100.0	100.0
AJAXSTPWP04F	8/5/2003	100.0	100.0
AJAXSTSFW04	8/5/2003	100.0	100.0
AJAXSTSFW04F	8/5/2003	100.0	100.0
AJAXSTSFW52	8/5/2003	100.0	100.0
AJAXSTSFW52F	8/5/2003	100.0	100.0
GRANSTSFW54	8/5/2003	100.0	100.0
GRANSTSFW54F	8/5/2003	100.0	100.0
LCSDW0805B	8/5/2003	100.0	100.0
LCSW0805B	8/5/2003	100.0	100.0
MAGNSTPWP01F	8/5/2003	100.0	100.0
MAGNSTSFW01	8/5/2003	100.0	100.0
MAGNSTSFW01F	8/5/2003	100.0	100.0
MAGNSTSFW02	8/5/2003	100.0	100.0
MAGNSTSFW02F	8/5/2003	100.0	100.0
PBW0805B	8/5/2003	100.0	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
AJAXADSFW07	8/8/2003	100.0	100.0
AJAXADSFW07F	8/8/2003	100.0	100.0
AJAXPDSFW06	8/8/2003	100.0	100.0
AJAXPDSFW06F	8/8/2003	100.0	100.0
AJAXSTPWP04F	8/8/2003	100.0	100.0
AJAXSTSFW04	8/8/2003	100.0	100.0
AJAXSTSFW04F	8/8/2003	100.0	100.0
AJAXSTSFW52	8/8/2003	100.0	100.0
AJAXSTSFW52F	8/8/2003	100.0	100.0
GRANSTSFW54	8/8/2003	100.0	100.0
GRANSTSFW54F	8/8/2003	100.0	100.0
LCSDW0808B	8/8/2003	100.0	100.0
LCSW0808B	8/8/2003	100.0	100.0
MAGNSTPWP01F	8/8/2003	100.0	100.0
MAGNSTSFW01	8/8/2003	100.0	100.0
MAGNSTSFW01F	8/8/2003	100.0	100.0
MAGNSTSFW02	8/8/2003	100.0	100.0
MAGNSTSFW02F	8/8/2003	100.0	100.0
PBW0808B	8/8/2003	100.0	100.0

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/30/2003 End Date: 7/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1650																								X
S10	1.00	1651																								X
S30	1.00	1652																								X
S50	1.00	1653																								X
S100	1.00	1654																								X
S200	1.00	1655																								X
S300	1.00	1656																								X
ICV	1.00	1658																								X
ICB	1.00	1659																								X
LRS	1.00	1700																								X
LRS	1.00	1701																								X
CCV	1.00	1702																								X
CCB	1.00	1703																								X
PBW0730B	1.00	1704																								X
ZZZZZZ	1.00	1705																								
LCS0730B	1.00	1706																								X
AJAXSTPWP04	1.00	1707																								X
AJAXSTSFW04	1.00	1708																								X
AJAXPDSFW06	1.00	1709																								X
AJAXADSFW07	1.00	1710																								X
AJAXSTSFW52	1.00	1711																								X
GRANSTSFW54	1.00	1711																								X
MAGNSTSFW01	1.00	1712																								X
CCV	1.00	1713																								X
CCB	1.00	1714																								X
MAGNSTPWP01	1.00	1715																								X
MAGNSTSFW02	1.00	1716																								X
ZZZZZZ	1.00	1717																								
ZZZZZZ	1.00	1718																								
ZZZZZZ	1.00	1719																								
ZZZZZZ	1.00	1720																								
ZZZZZZ	1.00	1721																								
ZZZZZZ	1.00	1722																								
ZZZZZZ	1.00	1723																								
ZZZZZZ	1.00	1724																								
CCV	1.00	1725																								X
CCB	1.00	1726																								X
ZZZZZZ	1.00	1727																								

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/30/2003 End Date: 7/30/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1728																								
ZZZZZZ	1.00	1729																								
LCSD0730B	1.00	1730																								X
CCV	1.00	1731																								X
CCB	1.00	1732																								X

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW003

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/20/2003 End Date: 8/20/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN				
S0	1.00	0857													X															
S	1.00	0901																												
S	1.00	0904													X															
S	1.00	0908																												
LRS	1.00	0912													X															
LRS	1.00	0917													X															
LRS	1.00	0921													X															
ICV	1.00	0925													X															
ICB	1.00	0929													X															
ICSA	1.00	0933													X															
ICSAB	1.00	0937													X															
CRI	1.00	0941													X															
CCV	1.00	0946													X															
CCB	1.00	0950													X															
PBW0808B	1.00	0954													X															
LCSW0808B	1.00	0958													X															
LCSDW0808B	1.00	1002													X															
ZZZZZZ	1.00	1006																												
ZZZZZZ	5.00	1010																												
AJAXSTSFW04	1.00	1014													X															
AJAXSTSFW04F	1.00	1018													X															
AJAXPDSFW06	1.00	1022													X															
AJAXPDSFW06F	1.00	1026													X															
AJAXADSFW07	1.00	1030													X															
CCV	1.00	1034													X															
CCB	1.00	1039													X															
AJAXADSFW07F	1.00	1043													X															
AJAXSTSFW52	1.00	1047													X															
ZZZZZZ	1.00	1051																												
GRANSTSFW54	1.00	1055													X															
ZZZZZZ	1.00	1059																												
MAGNSTSFW01	1.00	1103													X															
MAGNSTSFW01F	1.00	1107													X															
MAGNSTPWP01F	1.00	1111													X															
MAGNSTSFW02	1.00	1115													X															
MAGNSTSFW02F	1.00	1119													X															
CCV	1.00	1123													X															
CCB	1.00	1127													X															

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/20/2003 End Date: 8/20/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
ICSA	1.00	1132													X															
ICSAB	1.00	1136													X															
CRI	1.00	1140													X															
CCV	1.00	1144													X															
CCB	1.00	1148													X															

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/21/2003 End Date: 8/21/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0802		X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
S	1.00	0806		X						X				X		X				X			X							
S	1.00	0809			X	X															X			X						
S	1.00	0813					X	X	X		X	X	X				X		X			X			X	X				
LRS	1.00	0818		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
LRS	1.00	0822		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
LRS	1.00	0826		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ICV	1.00	0830		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ICB	1.00	0835		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ICSA	1.00	0839		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ICSAB	1.00	0843		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CRI	1.00	0847		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCV	1.00	0851		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCB	1.00	0855		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
PBW0808B	1.00	0900		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
LCSW0808B	1.00	0904		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
LCSDW0808B	1.00	0908		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
ZZZZZZ	1.00	0912																												
ZZZZZZ	5.00	0916																												
AJAXSTSFW04	1.00	0920		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXSTSFW04F	1.00	0924		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXPDSFW06	1.00	0928		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXPDSFW06F	1.00	0932		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXADSFW07	1.00	0936		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCV	1.00	0940		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCB	1.00	0944		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXADSFW07F	1.00	0948		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXSTSFW52	1.00	0952		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
AJAXSTSFW52F	1.00	0956		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
GRANSTSFW54	1.00	1000		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
GRANSTSFW54F	1.00	1005		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MAGNSTSFW01	1.00	1009		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MAGNSTSFW01F	1.00	1013		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MAGNSTPWP01F	1.00	1017		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MAGNSTSFW02	1.00	1021		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
MAGNSTSFW02F	1.00	1025		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCV	1.00	1029		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				
CCB	1.00	1033		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X				

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/21/2003 End Date: 8/21/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	
ZZZZZZ	1.00	1037																										
ZZZZZZ	5.00	1041																										
ZZZZZZ	10.00	1045																										
ZZZZZZ	50.00	1049																										
ICSA	1.00	1053		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
ICSAB	1.00	1058		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CRI	1.00	1102		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCV	1.00	1106		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		
CCB	1.00	1110		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X		

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/8/2003 End Date: 9/9/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	
S0	1.00	2204		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
S	1.00	2209		X						X				X		X					X			X				
S	1.00	2213			X	X									X							X			X			
S	1.00	2217					X	X	X		X	X	X				X			X			X			X	X	
LRS	1.00	2223		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
LRS	1.00	2228		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
LRS	1.00	2233		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
ICV	1.00	2238		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
ICB	1.00	2243		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
ICSA	1.00	2248		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
ICSAB	1.00	2254		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CRI	1.00	2259		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CRILOW	1.00	2304		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CCV	1.00	2309		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CCB	1.00	2314		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	2319																										
ZZZZZZ	1.00	2324																										
ZZZZZZ	1.00	2329																										
ZZZZZZ	5.00	2334																										
ZZZZZZ	1.00	2339																										
ZZZZZZ	1.00	2344																										
ZZZZZZ	5.00	2349																										
ZZZZZZ	1.00	2354																										
ZZZZZZ	1.00	2359																										
AJAXSTPWP04F	1.00	0004		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CCV	1.00	0009		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
CCB	1.00	0015		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
AJAXSTPWP04FL	5.00	0020		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	
AJAXSTSFW52F	1.00	0025													X													
GRANSTSFW54F	1.00	0030													X													
ZZZZZZ	100.00	0035																										
ZZZZZZ	1.00	0040																										
ZZZZZZ	1.00	0045																										
ZZZZZZ	1.00	0050																										
ZZZZZZ	1.00	0055																										
ZZZZZZ	5.00	0100																										
ZZZZZZ	1.00	0105																										
CCV	1.00	0110		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	

USEPA - CLP

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/8/2003 End Date: 9/9/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN	
CCB	1.00	0115		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ZZZZZZ	1.00	0120																										
ZZZZZZ	5.00	0125																										
ZZZZZZ	1.00	0130																										
ZZZZZZ	1.00	0135																										
ZZZZZZ	5.00	0140																										
ZZZZZZ	1.00	0145																										
ICSA	1.00	0150		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
ICSAB	1.00	0156		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRI	1.00	0201		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CRILOW	1.00	0206		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCV	1.00	0211		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	
CCB	1.00	0216		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X	

USEPA - CLP

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/8/2003 End Date: 8/8/2003

EPA Sample No.	D/F	Time	% R	Analytes																						
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1355																X								
S0.2	1.00	1356																X								
S0.5	1.00	1358																X								
S1	1.00	1400																X								
S5	1.00	1402																X								
S10	1.00	1404																X								
ICV	1.00	1406																X								
ICB	1.00	1408																X								
CRA	1.00	1410																X								
CCV	1.00	1411																X								
CCB	1.00	1413																X								
PBW0805B	1.00	1415																X								
LCSW0805B	1.00	1417																X								
LCSDW0805B	1.00	1418																X								
AJAXSTPWP04F	1.00	1420																X								
AJAXSTSFW04	1.00	1422																X								
AJAXSTSFW04F	1.00	1424																X								
AJAXPDSFW06	1.00	1425																X								
AJAXPDSFW06F	1.00	1427																X								
AJAXADSFW07	1.00	1429																X								
CCV	1.00	1431																X								
CCB	1.00	1433																X								
AJAXADSFW07F	1.00	1435																X								
AJAXSTSFW52	1.00	1436																X								
AJAXSTSFW52F	1.00	1438																X								
GRANSTSFW54	1.00	1440																X								
GRANSTSFW54F	1.00	1442																X								
MAGNSTSFW01	1.00	1443																X								
MAGNSTSFW01F	1.00	1445																X								
MAGNSTPWP01F	1.00	1447																X								
MAGNSTSFW02	1.00	1449																X								
CCV	1.00	1450																X								
CCB	1.00	1452																X								
MAGNSTSFW02F	1.00	1454																X								
ZZZZZZ	1.00	1455																								
ZZZZZZ	1.00	1458																								
ZZZZZZ	1.00	1459																								
ZZZZZZ	1.00	1501																								

USEPA - CLP

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW003

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/8/2003 End Date: 8/8/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	1503																										
ZZZZZZ	1.00	1505																										
ZZZZZZ	1.00	1507																										
ZZZZZZ	1.00	1509																										
CCV	1.00	1510																X										
CCB	1.00	1512																X										

SEVERN TRENT STL

September 9, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCW003

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 22, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94950		
535396	AJAXSTPWP04	07/17/03	Water
535397	AJAXSTPWP04F	07/17/03	Water
535398	AJAXSTSFW04	07/17/03	Water
535399	AJAXSTSFW04F	07/17/03	Water
535400	AJAXPDSFW06	07/17/03	Water
535401	AJAXPDSFW06F	07/17/03	Water
535402	AJAXADSFW07	07/17/03	Water
535403	AJAXADSFW07F	07/17/03	Water
535404	AJAXSTSFW52	07/17/03	Water
535405	AJAXSTSFW52F	07/17/03	Water
535406	GRANSTSFW54	07/17/03	Water
535407	GRANSTSFW54F	07/17/03	Water
535410	MAGNSTSFW01	07/18/03	Water
535411	MAGNSTSFW01F	07/18/03	Water
535412	MAGNSTPWP01	07/18/03	Water
535413	MAGNSTPWP01F	07/18/03	Water
535414	MAGNSTSFW02	07/18/03	Water
535415	MAGNSTSFW02F	07/18/03	Water

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal. Please note that sample GRANSTSFW53 listed on the chain-of-custody form with a sample date and time of July 17 at 1830 was not received. A similarly identified sample

(GRANSTSFW53MS) was listed on the second chain-of-custody form received on July 22, 2003. Based on how quality control samples had previously been identified, the laboratory identified this sample as the parent sample to be used for quality control purposes.

The analysis for arsenic speciation was performed by STL's North Canton facility, as approved by EA Engineering. STL North Canton assigned "Lot" numbers as samples were received. Though laboratory numbers may differ, the client's sample identifications were maintained. The results for this delivery group including a case narrative prepared by the North Canton laboratory are attached to this report.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Sulfate by 375.4
Please note that the due to instrumentation problems, sulfate was analyzed by Method 375.4 versus 300.0 as agreed to by the client.

Solids by 160.x
The analyses of all samples in this delivery group submitted for solids determinations (total, suspended, and / or dissolved) were performed one to two days beyond the method specified holding time of seven days. Samples were received with two days remaining in hold time and the laboratory analyzed all samples as quickly as was possible.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0412.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

STL Burlington
Colchester, Vermont

Sample Data Summary Package

SDG: GCW004

SEVERN TRENT STL

September 9, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCW004

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 22, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/22/03 ETR No: 94961		
535378	MAGNSTPWP02	07/18/03	Water
535379	MAGNSTPWP02F	07/18/03	Water
535380	MAGNSTSFW03	07/18/03	Water
535381	MAGNSTSFW03F	07/18/03	Water
535382	MAGNSTPWP03	07/18/03	Water
535383	MAGNSTPWP03F	07/18/03	Water
535384	MAGNPDSFW11	07/18/03	Water
535385	MAGNPDSFW11F	07/18/03	Water
535386	MAGNADSFW13	07/18/03	Water
535387	MAGNADSFW13F	07/18/03	Water
535388	GRANSTPWP54	07/18/03	Water
535389	GRANSTPWP54F	07/18/03	Water
535390	GRANSTPWP53	07/19/03	Water
535391	GRANSTPWP53F	07/19/03	Water
535392	GRANSTSFW53	07/19/03	Water
535392MS	GRANSTSFW53MS	07/19/03	Water
535392DP	GRANSTSFW53REP	07/19/03	Water
535393	GRANSTSFW53F	07/19/03	Water
535393MS	GRANSTSFW53FMS	07/19/03	Water
535393DP	GRANSTSFW53FREP	07/19/03	Water
535394	MAGNADSFW55	07/19/03	Water
535395	MAGNADSFW55F	07/19/03	Water

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Severn Trent Laboratories, Inc.
STL Burlington • 208 South Park Drive, Suite 1, Colchester, VT 05446
Tel 802 655 1203 Fax 802 655 1248 • *www.stl-inc.com*

A part of Severn Trent plc

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal.

The analysis for arsenic speciation was performed by STL's North Canton facility, as approved by EA Engineering. STL North Canton assigned "Lot" numbers as samples were received. Though laboratory numbers may differ, the client's sample identifications were maintained. The results for this delivery group including a case narrative prepared by the North Canton laboratory are attached to this report.

This narrative identifies anomalies that occurred during the analyses of samples in this delivery group. If there is no description following regarding a certain methodology requested on the chain-of-custody record, then there were no exceptions to the laboratory quality control criteria noted during that analysis.

Sulfate by 375.4
Please note that the due to instrumentation problems, sulfate was analyzed by Method 375.4 versus 300.0 as agreed to by the client.

Solids by 160.x
The dissolved solids analyses of samples MAGNSTSFW03, MAGNPDSFW11, and MAGNADSFW13 were performed one day beyond the method specified holding time of seven days. Samples were received with three days remaining in hold time and the laboratory analyzed all samples as quickly as was possible.

Reproducibility between the initial and duplicate total suspended solids analysis of sample GRANSTSFW53 was poor (RPD of 80). The laboratory could not reanalyze the sample for confirmational purposes due to limited sample volume.

Cyanide by 9012
An initial analysis for cyanide was performed on July 30, 2003 but results could not be used due to quality control failures. When preparing samples for reanalysis on July 31, 2003, the analyst found limited sample volume remaining for sample GRANSTSFW53 and consulted with the project manager on how to proceed. Not remembering that a second aliquot existed for cyanide analysis, the project manager instructed the laboratory to cancel the duplicate analysis and continue with the matrix spike analysis. Once this error was discovered, the holding time for cyanide was out by more than a month. The laboratory notified the client of this error and the client concurred that a duplicate analysis should not be performed at this time.

If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory.
This report is sequentially numbered starting with page 0001 and ending with page 0424.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtw/jmm

0001-C Last Alpha

Water p'2 of 2

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

CHAIN OF CUSTODY RECORD

Report to:
Company: EA Engineering
Address: 12011 Bel-Red Rd Suite 200
Bellevue, WA 98005
Contact: Jen Kindred
Phone: 425-451-7450
Fax: 425-451-7800
Contract/ Quote:

Invoice to:
Company: Same
Address:
Contact:
Phone:
Fax:

Lab Use Only
Due Date:

Temp. of coolers when received (C°): 1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Sampler's Name: Marty Green
Sampler's Signature:

Proj. No.: 13890.13
Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	Arsenic Speciation	pH, redox, SO4, etc.	Iss / TDS	TAL Metals-Total	TAL Metals-dissolved	Cyanide	Lab/Sample ID (Lab Use Only)
W	7/18/03	1630		X	MAGN-ST-PWP-02		1	1	1	X			X	X		
W	7/18/03	1700		X	MAGN-ST-SFW-03		3	1	2	X	X	X	X	X	X	
W	7/18/03	1530		X	MAGN-ST-PWP-03		1	1	1	X				X	X	
W	7/18/03	1445		X	MAGN-PD-SFW-11		3	1	2	X	X	X	X	X	X	
W	7/18/03	1700		X	MAGN-AD-SFW-13		3	1	2	X	X	X	X	X	X	
W	7/18/03	1832		X	GRAN-ST-PWP-54		1	1	1	X				X	X	
W	7/19/03	1400		X	GRAN-ST-PWP-53		1	1	1	X				X	X	
W	7/19/03	1350		X	GRAN-ST-SFW-53 MS		6	2	4	X	X	X	X	X	X	MS
W	7/19/03	1215		X	MAGN-AD-SFW-55		3	1	2	X	X	X	X	X	X	

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
	7-21-03	0800		7/22/03	1030
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil
[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other 500 mL

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNSTSFW03

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535380

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	315	
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	1	2.0	188	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	256	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	0.90	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	137	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	137	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	5	25.0	57.3	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.0	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNPDSFW11

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535384

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	899	
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	1	2.0	680	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	772	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	0.80	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	226	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	226	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	50	250	391	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	8.0	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNADSFW13

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535386

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	906	
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	1	2.0	680	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	841	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	28.7	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	230	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	230	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	100	500	637	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.0	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTSFW53

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCW004

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535392

Matrix: WATER
Client: EASEAT
Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	108	
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	1	2.0	80.0	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	100.0	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	1	0.50	7.2	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	46.9	
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	1	1.0	46.9	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	1	5.0	14.8	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.6	

Printed on: 09/05/03 02:50 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
MAGNADSFW55

Lab Name: STL BURLINGTON
Contract: LSO1024805
SDG No.: GCW004

Lab Code: STLVT
Case No.: 23046
Lab Sample ID: 535394

Matrix: WATER
Client: EASEAT
Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	07/25/03		umhos/cm	1	0.000	180	
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	1	2.0	112	
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	1	5.0	128	
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	2	0.77	90.5	
160.4	Volatile Suspended Solids	07/25/03		mg/L	1	5.0	7.1	
310.1	Hydroxide Alkalinity	07/29/03	BLKAL0729A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/29/03	BLKAL0729A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/29/03	BLKAL0729A	mg/L	1	1.0	111	
310.1	Total Alkalinity	07/29/03	BLKAL0729A	mg/L	1	1.0	111	
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	2	10.0	16.8	
9040B	Corrosivity by pH	07/25/03		pH Units	1	0.000	7.3	

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WET CHEMISTRY

Method Blank Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW004

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Conc.	Units	Qual.	DF	RL	Analytical Run Date	Analytical Batch
BLKAL0728A	310.1	Hydroxide Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Carbonate Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Bicarbonate Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0728A	310.1	Total Alkalinity	1.0	mg/L	U	1	1.0	07/28/03	BLKAL0728A
BLKAL0729A	310.1	Hydroxide Alkalinity	1.0	mg/L	U	1	1.0	07/29/03	BLKAL0729A
BLKAL0729A	310.1	Carbonate Alkalinity	1.0	mg/L	U	1	1.0	07/29/03	BLKAL0729A
BLKAL0729A	310.1	Bicarbonate Alkalinity	1.0	mg/L	U	1	1.0	07/29/03	BLKAL0729A
BLKAL0729A	310.1	Total Alkalinity	1.0	mg/L	U	1	1.0	07/29/03	BLKAL0729A
BLKDS0726A	160.1	Total Dissolved Solids	5.0	mg/L	U	1	5.0	07/26/03	BLKDS0726A
BLKHA0808A	130.2	Total Hardness as CaCO3	2.0	mg/L	U	1	2.0	08/08/03	BLKHA0808A
BLKSS0725A	160.2	Total Suspended Solids	0.50	mg/L	U	1	0.50	07/25/03	BLKSS0725A
BLKSU0811A	375.4	Sulfate	5.0	mg/L	U	1	5.0	08/11/03	BLKSU0811A

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WET CHEMISTRY

Matrix Spike Sample Report Summary

Client Sample No.
GRANSTSFW53MS

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535392MS

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Matrix Spike Result Conc.	Qual.	Sample Result Conc.	Qual.	Spike Added	% Recovery*
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	196		80.0		121.00	95.9
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	102		46.9		54.70	100.7
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	22.3		14.8		10.0	75.0

** Control Limit for Percent Recovery is 75-125%, unless otherwise specified.*

Printed on: 09/05/03 02:52 PM

WET CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.

GRANSTSFW53REP

Lab Name: STL BURLINGTON | **Contract:** LSO1024805 | **SDG No.:** GCW004

Lab Code: STLVT | **Case No.:** 23046 | **Lab Sample ID:** 535392DP

Matrix: WATER | **Client:** EASEAT | **Date Received:** 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Sample Result Qual.	Duplicate Sample Result Conc.	Duplicate Sample Result Qual.	RPD*
120.1	Conductivity (umhos/cm)	07/25/03		umhos/c	108		110		2
130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	80.0		80.0		0
160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	100.0		96.0		4
160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	7.2		3.1		80
160.4	Volatile Suspended Solids	07/25/03		mg/L	5.0	U	5.0	U	0
310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	1.0	U	1.0	U	0
310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	1.0	U	1.0	U	0
310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	46.9		48.2		3
310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	46.9		48.2		3
375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	14.8		14.6		1
9040B	Corrosivity by pH	07/25/03		pH Units	7.6		7.5		1

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

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WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW004

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCS DS0726A	160.1	Total Dissolved Solids	07/26/03	BLKDS0726A	mg/L	50.0	50.0	100.0
LCSAL0728A	310.1	Hydroxide Alkalinity	07/28/03	BLKAL0728A	mg/L	57.6	54.7000	105.3
LCSAL0728A	310.1	Carbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	57.6	54.7000	105.3
LCSAL0728A	310.1	Bicarbonate Alkalinity	07/28/03	BLKAL0728A	mg/L	57.6	54.7000	105.3
LCSAL0728A	310.1	Total Alkalinity	07/28/03	BLKAL0728A	mg/L	57.6	54.7000	105.3
LCSAL0729A	310.1	Hydroxide Alkalinity	07/29/03	BLKAL0729A	mg/L	58.2	54.7000	106.3
LCSAL0729A	310.1	Carbonate Alkalinity	07/29/03	BLKAL0729A	mg/L	58.2	54.7000	106.3
LCSAL0729A	310.1	Bicarbonate Alkalinity	07/29/03	BLKAL0729A	mg/L	58.2	54.7000	106.3
LCSAL0729A	310.1	Total Alkalinity	07/29/03	BLKAL0729A	mg/L	58.2	54.7000	106.3
LCSCD0725A	120.1	Conductivity (umhos/cm)	07/25/03		umhos/c	930	977.0000	95.2
LCSHA0808A	130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	124	121.0000	102.5
LCSPH0725A	9040B	Corrosivity by pH	07/25/03		pH Units	6.0	6.0000	100.0
LCSSS0725A	160.2	Total Suspended Solids	07/25/03	BLKSS0725A	mg/L	502	500	100.4
LCSSU0811A	375.4	Sulfate	08/11/03	BLKSU0811A	mg/L	9.6	10.0	96.0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

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WET CHEMISTRY

Laboratory Control Sample Duplicate
Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW004

Lab Code: STLVT **Case No.:** 23046

Matrix: SOIL **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCSD Conc.	True Value	% Recovery*	RPD**
LCSDCD0725A	120.1	Conductivity (umhos/cm)	07/25/03		umhos/c	958	977.0000	98.1	3
LCSDHA0808A	130.2	Total Hardness as CaCO3	08/08/03	BLKHA0808A	mg/L	124	121.0000	102.5	0
LCSDPH0725A	9040B	Corrosivity by pH	07/25/03		pH Units	6.0	6.0000	100.2	0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*
*** Control Limit for RPD is +/- 20%, unless otherwise specified.*

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Sample Data Summary Package For Metals

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
GRANSTPWP53	535390
GRANSTPWP53F	535391
GRANSTPWP54	535388
GRANSTPWP54F	535389
GRANSTSFW53	535392
GRANSTSFW53D	535392DP
GRANSTSFW53F	535393
GRANSTSFW53FD	535393DP
GRANSTSFW53FS	535393MS
GRANSTSFW53S	535392MS
MAGNADSFW13	535386
MAGNADSFW13F	535387
MAGNADSFW55	535394
MAGNADSFW55F	535395
MAGNPDSFW11	535384
MAGNPDSFW11F	535385
MAGNSTPWP02	535378
MAGNSTPWP02F	535379
MAGNSTPWP03	535382
MAGNSTPWP03F	535383
MAGNSTSFW03	535380
MAGNSTSFW03F	535381

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPWP53

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535390

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPWP53F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535391

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	60.5	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	16.7			P
7440-39-3	Barium	47.6	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	15500			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	23.3	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	3580	B		P
7439-96-5	Manganese	4.0	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2000	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3420	B		P
7440-28-0	Thallium	4.1	B		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	5.9	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPWP54

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535388

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTPWP54F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535389

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	45.7	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	13.2			P
7440-39-3	Barium	45.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	16700			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	16.8	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	4440	B		P
7439-96-5	Manganese	4.4	B		P
7439-97-6	Mercury	0.12	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1830	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3540	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	5.4	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTSFW53

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535392

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	93.9	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	13.1			P
7440-39-3	Barium	54.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	15100			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	113			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	3470	B		P
7439-96-5	Manganese	18.8			P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1850	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3130	B		P
7440-28-0	Thallium	3.1	B		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	3.6	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

GRANSTSFW53F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535393

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	79.3	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	13.1			P
7440-39-3	Barium	55.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	15300			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	16.8	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	3540	B		P
7439-96-5	Manganese	10.3	B		P
7439-97-6	Mercury	0.20	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1870	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3380	B		P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	3.1	B		P

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNADSFW13

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535386

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	367			P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	239			P
7440-39-3	Barium	26.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	134000			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	13.0	B		P
7440-50-8	Copper	5.3	B		P
7439-89-6	Iron	9530			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	69400			P
7439-96-5	Manganese	1740			P
7439-97-6	Mercury	0.33			CV
7440-02-0	Nickel	68.0			P
7440-09-7	Potassium	4930	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6420			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	35.3			P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNADSFW13F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535387

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.5	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	61.6			P
7440-39-3	Barium	21.1	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	132000			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	11.1	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	955			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	68700			P
7439-96-5	Manganese	1690			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	64.7			P
7440-09-7	Potassium	4800	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	5780			P
7440-28-0	Thallium	4.3	B		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	26.1			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNADSFW55

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535394

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	1180			P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	52.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	21500			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	B		P
7439-89-6	Iron	636			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	10500			P
7439-96-5	Manganese	48.9			P
7439-97-6	Mercury	0.13	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1360	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6340			P
7440-28-0	Thallium	3.7	B		P
7440-62-2	Vanadium	2.6	B		P
7440-66-6	Zinc	5.4	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNADSFW55F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535395

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	57.2	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	42.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	21500			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	4.6	B		P
7439-89-6	Iron	16.8	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	10600			P
7439-96-5	Manganese	36.1			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1480	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6360			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	4.6	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP
-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNPDSFW11

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535384

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.4	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	9.7	B		P
7440-39-3	Barium	16.2	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	133000			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	5.5	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	64.3	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	69100			P
7439-96-5	Manganese	905			P
7439-97-6	Mercury	0.14	B		CV
7440-02-0	Nickel	39.4	B		P
7440-09-7	Potassium	4680	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	5580			P
7440-28-0	Thallium	3.1	B		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	11.5	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNPDSFW11F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535385

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	29.4	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	7.7	B		P
7440-39-3	Barium	15.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	134000			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	5.2	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	484			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	69800			P
7439-96-5	Manganese	880			P
7439-97-6	Mercury	0.16	B		CV
7440-02-0	Nickel	43.0			P
7440-09-7	Potassium	4750	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	5870			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	11.9	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535378

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP02F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535379

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	26.2			P
7440-39-3	Barium	76.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	41800			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	65.2	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	19300			P
7439-96-5	Manganese	8.6	B		P
7439-97-6	Mercury	0.19	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2380	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6400			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	9.7	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535382

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

MAGNSTPWP03F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535383

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	27.3			P
7440-39-3	Barium	74.2	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	41700			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	86.9	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	19200			P
7439-96-5	Manganese	3.7	B		P
7439-97-6	Mercury	0.14	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2470	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6320			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	8.5	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNSTSFW03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535380

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	40.5	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	29.6			P
7440-39-3	Barium	73.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	42200			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	266			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	19400			P
7439-96-5	Manganese	7.4	B		P
7439-97-6	Mercury	0.18	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2410	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6200			P
7440-28-0	Thallium	2.8	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	4.0	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
MAGNSTSFW03F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Lab Sample ID: 535381

Level (low/med): LOW Date Received: 7/22/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	33.4	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	28.2			P
7440-39-3	Barium	71.7	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	41900			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	112			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	19300			P
7439-96-5	Manganese	4.7	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	2400	B		P
7782-49-2	Selenium	1.7	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	6100			P
7440-28-0	Thallium	3.1	B		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	3.3	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum	26000.0	26420.00	101.6	30200.0	30410.00	100.7	30340.00	100.5	P
Antimony	250.0	261.90	104.8	300.0	315.60	105.2	316.60	105.5	P
Arsenic	250.0	255.90	102.4	100.0	102.00	102.0	102.90	102.9	P
Barium	500.0	509.40	101.9	200.0	203.90	102.0	205.00	102.5	P
Beryllium	500.0	519.40	103.9	100.0	101.10	101.1	101.10	101.1	P
Cadmium	500.0	505.30	101.1	100.0	100.20	100.2	99.74	99.7	P
Calcium	25000.0	25630.00	102.5	30200.0	30380.00	100.6	30310.00	100.4	P
Chromium	500.0	513.00	102.6	200.0	205.40	102.7	206.10	103.0	P
Cobalt	500.0	506.80	101.4	200.0	203.40	101.7	205.00	102.5	P
Copper	500.0	517.40	103.5	200.0	206.20	103.1	207.50	103.8	P
Lead	1000.0	1018.00	101.8	400.0	399.90	100.0	403.30	100.8	P
Magnesium	25000.0	25460.00	101.8	30200.0	30390.00	100.6	30510.00	101.0	P
Manganese	500.0	509.60	101.9	200.0	202.90	101.4	203.30	101.6	P
Mercury	3.0	3.09	103.0	5.0	4.98	99.6	4.87	97.4	CV
Nickel	500.0	509.80	102.0	200.0	200.10	100.0	202.60	101.3	P
Potassium	25000.0	26150.00	104.6	30200.0	31870.00	105.5	32090.00	106.3	P
Silver	500.0	505.80	101.2	100.0	103.60	103.6	104.20	104.2	P
Sodium	25000.0	25080.00	100.3	30200.0	30150.00	99.8	30280.00	100.3	P
Vanadium	500.0	509.50	101.9	200.0	202.50	101.2	203.80	101.9	P
Zinc	500.0	512.80	102.6	200.0	205.70	102.8	206.50	103.2	P
Cyanide	120.0	118.54	98.8	150.0	146.46	97.6	149.40	99.6	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum				30200.0	30490.00	101.0	30480.00	100.9	P
Antimony				300.0	325.70	108.6	323.60	107.9	P
Arsenic				100.0	106.90	106.9	106.70	106.7	P
Barium				200.0	209.00	104.5	207.60	103.8	P
Beryllium				100.0	101.60	101.6	101.60	101.6	P
Cadmium				100.0	99.81	99.8	99.95	100.0	P
Calcium				30200.0	30140.00	99.8	30430.00	100.8	P
Chromium				200.0	208.40	104.2	209.00	104.5	P
Cobalt				200.0	208.10	104.0	210.30	105.2	P
Copper				200.0	212.20	106.1	209.80	104.9	P
Lead				400.0	407.10	101.8	410.20	102.6	P
Magnesium				30200.0	30700.00	101.7	30850.00	102.2	P
Manganese				200.0	205.10	102.6	205.30	102.6	P
Mercury				5.0	4.61	92.2	4.73	94.6	CV
Nickel				200.0	203.50	101.8	205.20	102.6	P
Potassium				30200.0	32310.00	107.0	32330.00	107.1	P
Silver				100.0	105.10	105.1	104.70	104.7	P
Sodium				30200.0	30980.00	102.6	30730.00	101.8	P
Vanadium				200.0	205.90	103.0	206.40	103.2	P
Zinc				200.0	210.10	105.0	209.50	104.8	P
Cyanide				150.0	149.12	99.4			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Mercury				5.0	4.94	98.8	4.80	96.0	CV

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Iron	25500.0	26250.00	102.9	30200.0	31150.00	103.1	31010.00	102.7	P
Selenium	250.0	244.90	98.0	100.0	101.00	101.0	102.80	102.8	P
Thallium	250.0	238.80	95.5	100.0	101.40	101.4	100.50	100.5	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Iron				30200.0	30430.00	100.8	30760.00	101.9	P
Selenium				100.0	101.40	101.4	103.10	103.1	P
Thallium				100.0	98.09	98.1	105.80	105.8	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Aluminum				400.0	515.30	128.8	565.50	141.4
Antimony				120.0	126.60	105.5	127.80	106.5
Arsenic				20.0	21.98	109.9	22.00	110.0
Barium				400.0	403.60	100.9	409.20	102.3
Beryllium				10.0	10.25	102.5	9.89	98.9
Cadmium				10.0	10.11	101.1	10.03	100.3
Calcium				10000.0	10550.00	105.5	10530.00	105.3
Chromium				20.0	21.69	108.4	23.12	115.6
Cobalt				100.0	99.11	99.1	102.50	102.5
Copper				50.0	50.35	100.7	50.86	101.7
Lead				6.0	6.64	110.7	6.28	104.7
Magnesium				10000.0	10260.00	102.6	10390.00	103.9
Manganese				30.0	30.33	101.1	30.53	101.8
Mercury	0.2	0.30	150.0					
Nickel				80.0	80.58	100.7	81.80	102.2
Potassium				10000.0	11640.00	116.4	11800.00	118.0
Silver				20.0	19.80	99.0	20.41	102.0
Sodium				10000.0	9906.00	99.1	10200.00	102.0
Vanadium				100.0	98.91	98.9	100.60	100.6
Zinc				40.0	41.60	104.0	42.62	106.6

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Initial Found	Initial %R	Final Found	Final %R
Iron				200.0	329.10	164.6	379.50	189.8
Selenium				10.0	9.21	92.1	8.74	87.4
Thallium				20.0	19.06	95.3	22.25	111.2

Control Limits: no limits have been established by EPA at this time

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	38.3	B	23.600	U	P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U	4.700	U	P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U	4.800	U	P
Barium	5.9	U	5.9	U	5.9	U	5.9	U	5.900	U	P
Beryllium	0.2	U	0.2	U	0.2	U	-0.3	B	0.200	U	P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.600	U	P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U	182.100	U	P
Chromium	-1.6	B	-2.0	B	-1.4	B	1.4	U	1.400	U	P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Copper	2.4	U	2.4	U	2.4	U	2.4	U	2.400	U	P
Iron									38.690	B	P
Lead	1.3	U	1.3	U	1.3	U	1.3	U	-1.315	B	P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U	178.300	U	P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U	0.700	U	P
Mercury	0.1	B	0.1	U	0.1	U	0.1	U	0.140	B	CV
Nickel	-6.2	B	-5.2	B	-5.7	B	-4.9	B	-4.287	B	P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U	393.000	U	P
Selenium									1.700	U	P
Silver	2.2	U	2.2	U	2.2	U	2.2	U	2.200	U	P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U	472.700	U	P
Thallium									2.969	B	P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	2.758	B	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			37.2	B							P
Antimony			4.7	U							P
Arsenic			4.8	U							P
Barium			5.9	U							P
Beryllium			-0.2	B							P
Cadmium			0.6	U							P
Calcium			182.1	U							P
Chromium			-1.7	B							P
Cobalt			2.0	U							P
Copper			2.4	U							P
Lead			1.3	U							P
Magnesium			178.3	U							P
Manganese			0.7	U							P
Mercury			0.2	B	0.1	U	0.1	B			CV
Nickel			-5.3	B							P
Potassium			393.0	U							P
Silver			2.2	U							P
Sodium			472.7	U							P
Vanadium			2.0	U							P
Zinc			1.0	U							P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Iron	16.8	U	16.8	U	16.8	U	16.8	U			P
Selenium	1.7	U	-2.3	B	1.7	U	1.7	U			P
Thallium	2.8	U	2.8	U	2.8	U	2.8	U			P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Iron			16.8	U							P
Selenium			1.7	U							P
Thallium			2.8	U							P

USEPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	500100	501500.0	103.9	497800	499700.0	103.5
Antimony	0	596	0	647.4	108.6	0	666.2	111.8
Arsenic	0	102	10	113.2	111.0	8	110.8	108.6
Barium	0	503	2	523.0	104.0	2	529.7	105.3
Beryllium	0	482	0	502.0	104.1	-1	506.6	105.1
Cadmium	0	938	3	973.0	103.7	2	968.8	103.3
Calcium	500000	477840	497700	502700.0	105.2	493300	501900.0	105.0
Chromium	0	483	2	500.3	103.6	2	507.5	105.1
Cobalt	0	457	-2	480.5	105.1	-2	496.1	108.6
Copper	0	526	3	541.0	102.9	2	549.5	104.5
Lead	0	49	2	49.2	100.4	1	51.3	104.7
Magnesium	500000	521880	547200	552400.0	105.8	552300	561900.0	107.7
Manganese	0	474	1	493.7	104.2	1	498.4	105.1
Nickel	0	952	-4	1005.0	105.6	-4	1029.0	108.1
Potassium	0	0	-10	64.4		-115	0.0	
Silver	0	213	-1	219.2	102.9	0	219.7	103.1
Sodium	0	0	-103	-371.9		-125	-56.2	
Vanadium	0	478	-1	488.0	102.1	0	494.7	103.5
Zinc	0	998	7	1042.0	104.4	7	1064.0	106.6

USEPA - CLP

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Iron	200000	172540	201500	201200.0	116.6	204100	199300.0	115.5
Selenium	0	48	-2	50.0	104.2	-3	46.9	97.7
Thallium	0	95	4	98.7	103.9	0	105.8	111.4

USEPA - CLP

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTSFW53S

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75 - 125	2214.0000		93.8800	B	2000.00	106.0		P
Antimony	75 - 125	556.9000		4.7000	U	500.00	111.4		P
Arsenic	75 - 125	55.7400		13.1400		40.00	106.5		P
Barium	75 - 125	2117.0000		54.7500	B	2000.00	103.1		P
Beryllium	75 - 125	51.6100		0.2000	U	50.00	103.2		P
Cadmium	75 - 125	50.8700		0.6000	U	50.00	101.7		P
Chromium	75 - 125	208.5000		1.4000	U	200.00	104.2		P
Cobalt	75 - 125	521.2000		2.0000	U	500.00	104.2		P
Copper	75 - 125	269.3000		2.4000	U	250.00	107.7		P
Iron	75 - 125	1252.0000		112.8000		1000.00	113.9		P
Lead	75 - 125	18.6400		1.3000	U	20.00	93.2		P
Manganese	75 - 125	541.4000		18.8000		500.00	104.5		P
Mercury	75 - 125	0.9280		0.1120	B	1.00	81.6		CV
Nickel	75 - 125	521.2000		2.1000	U	500.00	104.2		P
Selenium	75 - 125	10.6100		1.7000	U	10.00	106.1		P
Silver	75 - 125	52.0700		2.2000	U	50.00	104.1		P
Thallium	75 - 125	53.5800		3.0880	B	50.00	101.0		P
Vanadium	75 - 125	525.5000		2.0000	U	500.00	105.1		P
Zinc	75 - 125	543.3000		3.5690	B	500.00	107.9		P
Cyanide	75 - 125	104.0662		10.0000	U	100.00	104.1		AS

Comments:

USEPA - CLP

5A

SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTSFW53FS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added (SA)	%R	Q	M
Aluminum	75 - 125	2127.0000		79.2600	B	2000.00	102.4		P
Antimony	75 - 125	561.2000		4.7000	U	500.00	112.2		P
Arsenic	75 - 125	54.6000		13.0600		40.00	103.8		P
Barium	75 - 125	2108.0000		54.9500	B	2000.00	102.7		P
Beryllium	75 - 125	51.8500		0.2000	U	50.00	103.7		P
Cadmium	75 - 125	51.2000		0.6000	U	50.00	102.4		P
Chromium	75 - 125	210.9000		1.4000	U	200.00	105.4		P
Cobalt	75 - 125	529.0000		2.0000	U	500.00	105.8		P
Copper	75 - 125	267.2000		2.4000	U	250.00	106.9		P
Iron	75 - 125	1131.0000		16.8000	U	1000.00	113.1		P
Lead	75 - 125	19.7100		1.3000	U	20.00	98.6		P
Manganese	75 - 125	535.0000		10.3100	B	500.00	104.9		P
Mercury	75 - 125	1.0200		0.1980	B	1.00	82.2		CV
Nickel	75 - 125	526.9000		2.1000	U	500.00	105.4		P
Selenium	75 - 125	8.4000		1.7000	U	10.00	84.0		P
Silver	75 - 125	53.0400		2.2000	U	50.00	106.1		P
Thallium	75 - 125	55.6100		2.8000	U	50.00	111.2		P
Vanadium	75 - 125	528.2000		2.0000	U	500.00	105.6		P
Zinc	75 - 125	543.4000		3.0900	B	500.00	108.1		P

Comments:

USEPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTSFW53A

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS _____ SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		2278.00		93.88	B	2000.0	109.2		P
Antimony		573.00		4.70	U	500.0	114.6		P
Arsenic		54.03		13.14		40.0	102.2		P
Barium		2165.00		54.75	B	2000.0	105.5		P
Beryllium		53.31		0.20	U	50.0	106.6		P
Cadmium		52.61		0.60	U	50.0	105.2		P
Chromium		216.10		1.40	U	200.0	108.0		P
Cobalt		538.60		2.00	U	500.0	107.7		P
Copper		276.10		2.40	U	250.0	110.4		P
Iron		1191.00		112.80		1000.0	107.8		P
Lead		19.58		1.30	U	20.0	97.9		P
Manganese		557.40		18.80		500.0	107.7		P
Nickel		540.40		2.10	U	500.0	108.1		P
Selenium		8.92		1.70	U	10.0	89.2		P
Silver		55.71		2.20	U	50.0	111.4		P
Thallium		54.03		3.09	B	50.0	101.9		P
Vanadium		541.90		2.00	U	500.0	108.4		P
Zinc		559.50		3.57	B	500.0	111.2		P

Comments: _____

USEPA - CLP

5B

POST DIGEST SPIKE SAMPLE RECOVERY

SAMPLE NO.

GRANSTSFW53FA

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS _____ SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR)	C	Sample Result (SR)	C	Spike Added(SA)	%R	Q	M
Aluminum		2311.00		79.26	B	2000.0	111.6		P
Antimony		588.90		4.70	U	500.0	117.8		P
Arsenic		52.79		13.06		40.0	99.3		P
Barium		2239.00		54.95	B	2000.0	109.2		P
Beryllium		54.66		0.20	U	50.0	109.3		P
Cadmium		53.89		0.60	U	50.0	107.8		P
Chromium		222.40		1.40	U	200.0	111.2		P
Cobalt		554.90		2.00	U	500.0	111.0		P
Copper		285.40		2.40	U	250.0	114.2		P
Iron		1140.00		16.80	U	1000.0	114.0		P
Lead		20.85		1.30	U	20.0	104.2		P
Manganese		564.00		10.31	B	500.0	110.7		P
Nickel		553.10		2.10	U	500.0	110.6		P
Selenium		8.90		1.70	U	10.0	89.0		P
Silver		57.05		2.20	U	50.0	114.1		P
Thallium		56.00		2.80	U	50.0	112.0		P
Vanadium		558.90		2.00	U	500.0	111.8		P
Zinc		576.10		3.09	B	500.0	114.6		P

Comments: _____

6
DUPLICATES

SAMPLE NO.

GRANSTSFW53D

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		93.8800	B	124.1000	B	27.7		P
Antimony		4.7000	U	4.7000	U			P
Arsenic	10.0	13.1400		13.0400		0.8		P
Barium		54.7500	B	56.8200	B	3.7		P
Beryllium		0.2000	U	0.2000	U			P
Cadmium		0.6000	U	0.6000	U			P
Calcium	5000.0	15090.0000		15430.0000		2.2		P
Chromium		1.4000	U	1.4000	U			P
Cobalt		2.0000	U	2.0000	U			P
Copper		2.4000	U	2.4000	U			P
Iron	100.0	112.8000		125.7000		10.8		P
Lead		1.3000	U	1.3000	U			P
Magnesium		3472.0000	B	3565.0000	B	2.6		P
Manganese	15.0	18.8000		19.4700		3.5		P
Mercury		0.1120	B	0.1350	B	18.6		CV
Nickel		2.1000	U	2.1000	U			P
Potassium		1851.0000	B	1909.0000	B	3.1		P
Selenium		1.7000	U	1.7000	U			P
Silver		2.2000	U	2.2000	U			P
Sodium		3130.0000	B	3381.0000	B	7.7		P
Thallium		3.0880	B	2.8000	U	200.0		P
Vanadium		2.0000	U	2.0000	U			P
Zinc		3.5690	B	3.5530	B	0.4		P

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6

DUPLICATES

SAMPLE NO.

GRANSTSFW53FD

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

% Solids for Sample: 0.0 % Solids for Duplicate: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum		79.2600	B	51.9700	B	41.6		P
Antimony		4.7000	U	4.7000	U			P
Arsenic	10.0	13.0600		11.8800		9.5		P
Barium		54.9500	B	54.6200	B	0.6		P
Beryllium		0.2000	U	0.2000	U			P
Cadmium		0.6000	U	0.6000	U			P
Calcium	5000.0	15340.0000		15380.0000		0.3		P
Chromium		1.4000	U	1.4000	U			P
Cobalt		2.0000	U	2.0000	U			P
Copper		2.4000	U	2.4000	U			P
Iron		16.8000	U	29.4700	B	200.0		P
Lead		1.3000	U	1.3000	U			P
Magnesium		3535.0000	B	3553.0000	B	0.5		P
Manganese		10.3100	B	10.1800	B	1.3		P
Mercury		0.1980	B	0.1300	B	41.5		CV
Nickel		2.1000	U	2.1000	U			P
Potassium		1867.0000	B	1886.0000	B	1.0		P
Selenium		1.7000	U	1.7000	U			P
Silver		2.2000	U	2.2000	U			P
Sodium		3385.0000	B	3407.0000	B	0.6		P
Thallium		2.8000	U	2.9720	B	200.0		P
Vanadium		2.0000	U	2.0000	U			P
Zinc		3.0900	B	3.3390	B	7.7		P

7

LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L)			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Aluminum	51000.0	51820.00	101.6					
Antimony	2000.0	2143.00	107.2					
Arsenic	1050.0	1084.00	103.2					
Barium	500.0	509.70	101.9					
Beryllium	500.0	512.50	102.5					
Cadmium	525.0	521.70	99.4					
Calcium	50000.0	50990.00	102.0					
Chromium	500.0	508.30	101.7					
Cobalt	500.0	503.90	100.8					
Copper	500.0	517.70	103.5					
Iron	50500.0	51970.00	102.9					
Lead	1015.0	1021.00	100.6					
Magnesium	50000.0	51250.00	102.5					
Manganese	500.0	504.50	100.9					
Mercury	1.0	0.96	96.0					
Nickel	500.0	507.50	101.5					
Potassium	50000.0	50830.00	101.7					
Selenium	525.0	542.60	103.4					
Silver	500.0	422.90	84.6					
Sodium	50000.0	51680.00	103.4					
Thallium	550.0	538.70	97.9					
Vanadium	500.0	512.10	102.4					
Zinc	500.0	514.60	102.9					
Cyanide	120.0	121.37	101.1					

9
ICP SERIAL DILUTIONS

SAMPLE NO.

GRANSTSFW53L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	93.88	B	235.20	B	150.5		P
Antimony	4.70	U	23.50	U			P
Arsenic	13.14		24.00	U	100.0		P
Barium	54.75	B	55.07	B	0.6		P
Beryllium	0.20	U	1.00	U			P
Cadmium	0.60	U	3.00	U			P
Calcium	15090.00		15200.00	B	0.7		P
Chromium	1.40	U	7.00	U			P
Cobalt	2.00	U	10.00	U			P
Copper	2.40	U	12.00	U			P
Iron	112.80		106.30	B	5.8		P
Lead	1.30	U	6.50	U			P
Magnesium	3472.00	B	3458.00	B	0.4		P
Manganese	18.80		17.69	B	5.9		P
Nickel	2.10	U	10.50	U			P
Potassium	1851.00	B	1965.00	U	100.0		P
Selenium	1.70	U	8.50	U			P
Silver	2.20	U	11.00	U			P
Sodium	3130.00	B	2410.00	B	23.0		P
Thallium	3.09	B	14.00	U	100.0		P
Vanadium	2.00	U	10.00	U			P
Zinc	3.57	B	5.14	B	44.0		P

9
ICP SERIAL DILUTIONS

SAMPLE NO.

GRANSTSFW53FL

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	79.26	B	362.70	B	357.6		P
Antimony	4.70	U	23.50	U			P
Arsenic	13.06		24.00	U	100.0		P
Barium	54.95	B	55.77	B	1.5		P
Beryllium	0.20	U	1.00	U			P
Cadmium	0.60	U	3.00	U			P
Calcium	15340.00		15510.00	B	1.1		P
Chromium	1.40	U	7.00	U			P
Cobalt	2.00	U	10.00	U			P
Copper	2.40	U	12.00	U			P
Iron	16.80	U	84.00	U			P
Lead	1.30	U	6.50	U			P
Magnesium	3535.00	B	3545.00	B	0.3		P
Manganese	10.31	B	8.54	B	17.2		P
Nickel	2.10	U	10.50	U			P
Potassium	1867.00	B	1965.00	U	100.0		P
Selenium	1.70	U	8.50	U			P
Silver	2.20	U	11.00	U			P
Sodium	3385.00	B	2363.50	U	100.0		P
Thallium	2.80	U	14.00	U			P
Vanadium	2.00	U	10.00	U			P
Zinc	3.09	B	5.00	U	100.0		P

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: Date: 7/1/2003

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: _____ Date: 7/1/2003

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments: _____

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	308.215		200	23.6	P
Antimony	206.838		60	4.7	P
Arsenic	189.042		10	4.8	P
Barium	493.409		200	5.9	P
Beryllium	313.042		5	0.2	P
Cadmium	226.502		5	0.6	P
Calcium	317.933		5000	182.1	P
Chromium	267.716		10	1.4	P
Cobalt	228.616		50	2.0	P
Copper	324.754		25	2.4	P
Lead	220.353		3	1.3	P
Magnesium	279.078		5000	178.3	P
Manganese	257.610		15	0.7	P
Nickel	231.604		40	2.1	P
Potassium	766.491		5000	393.0	P
Silver	328.068		10	2.2	P
Sodium	330.232		5000	472.7	P
Vanadium	292.402		50	2.0	P
Zinc	213.856		20	1.0	P

Comments:

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Flame AA ID Number: _____

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Iron	271.441		100	16.8	P
Selenium	196.026		5	1.7	P
Thallium	190.864		10	2.8	P

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for: Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Al	Ca	Fe	Mg	Ag
Aluminum	308.215	0.0000000	0.0000000	-0.0002180	0.0000000	0.0000000
Antimony	206.838	0.0000080	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000170	0.0000000	-0.0000590	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	-0.0000740	0.0000000	0.0000000
Cadmium	226.502	0.0000010	0.0000000	0.0000590	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000100	0.0000000	-0.0000200	0.0000060	0.0000000
Cobalt	228.616	0.0000000	0.0000000	-0.0000400	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0001740	0.0000000	0.0000000	-0.001587	0.0000000
Lead	220.353	-0.0000300	0.0000000	0.0000550	-0.000006	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	-0.0000520	0.0000000	0.0000000
Phosphorus	178.287	0.0000070	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	-0.0007500	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000240	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000080	0.0000000	-0.0001100	0.0000000	0.0000000
Tin	189.989	0.0000090	0.0000000	-0.0000750	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000140	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000030	0.0000040	0.0000000
Zinc	206.200	0.0000300	0.0000000	-0.0000600	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		As	B	Be	Cd	Co
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	-0.0082960
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001900
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	0.0000000	0.0000000	0.0002350
Tin	189.989	0.0000000	0.0000000	-0.0004370	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Cr	Cu	Mn	Na	Ni
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0078510	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	-0.0002840	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	-0.0001750
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0008900	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000800
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	-0.0007400	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	0.0000000	0.0000000	-0.0004500	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0044570	0.0000000	0.0000000	0.0000000	0.0000000

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Pb	Sb	Se	Si	Tl
Aluminum	308.215	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.838	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.409	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.042	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.678	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.502	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.933	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.716	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.616	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.754	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.441	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.353	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Magnesium	279.079	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.610	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.030	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.604	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Phosphorus	178.287	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.491	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.026	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.068	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.232	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Strontium	421.552	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.864	-0.0003500	0.0000000	0.0000000	0.0000000	0.0000000
Tin	189.989	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Titanium	334.941	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.402	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	206.200	0.0003900	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 10/1/2002

Analyte	Wave-length (nm)	Interelement Correction Factors for: V	Zn			
Aluminum	308.215	0.0173200	0.0000000			
Antimony	206.838	-0.0012700	0.0000000			
Arsenic	189.042	-0.0002800	0.0000000			
Barium	493.409	0.0000000	0.0000000			
Beryllium	313.042	0.0004800	0.0000000			
Boron	249.678	0.0000000	0.0000000			
Cadmium	226.502	0.0000000	0.0000000			
Calcium	317.933	0.0000000	0.0000000			
Chromium	267.716	-0.0003600	0.0000000			
Cobalt	228.616	0.0000000	0.0000000			
Copper	324.754	0.0000000	0.0000000			
Iron	271.441	0.0081200	0.0000000			
Lead	220.353	-0.0000850	0.0000000			
Magnesium	279.079	0.0000000	0.0000000			
Manganese	257.610	0.0000000	0.0000000			
Molybdenum	202.030	0.0000000	0.0000000			
Nickel	231.604	0.0000000	0.0000000			
Phosphorus	178.287	0.0000000	0.0164830			
Potassium	766.491	0.0000000	0.0000000			
Selenium	196.026	0.0000000	0.0000000			
Silver	328.068	-0.0003350	0.0000000			
Sodium	330.232	-0.1479730	0.6581000			
Strontium	421.552	0.0000000	0.0000000			
Thallium	190.864	0.0014900	0.0000000			
Tin	189.989	0.0000000	0.0000000			
Titanium	334.941	0.0000000	0.0000000			
Vanadium	292.402	0.0000000	0.0000000			
Zinc	206.200	-0.0004730	0.0000000			

Comments: _____

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12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Aluminum	10.00	1000000.0	P
Antimony	10.00	100000.0	P
Arsenic	10.00	5000.0	P
Barium	10.00	10000.0	P
Beryllium	10.00	5000.0	P
Cadmium	10.00	5000.0	P
Calcium	10.00	600000.0	P
Chromium	10.00	100000.0	P
Cobalt	10.00	100000.0	P
Copper	10.00	10000.0	P
Lead	10.00	10000.0	P
Magnesium	10.00	500000.0	P
Manganese	10.00	10000.0	P
Nickel	10.00	10000.0	P
Potassium	10.00	100000.0	P
Silver	10.00	2000.0	P
Sodium	10.00	100000.0	P
Vanadium	10.00	100000.0	P
Zinc	10.00	5000.0	P

Comments:

USEPA - CLP

12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

ICP ID Number: TJA ICAP 6 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Iron	10.00	1000000.0	P
Selenium	10.00	5000.0	P
Thallium	10.00	5000.0	P

Comments: _____

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
GRANSTPWP53	7/31/2003	50.0	50.0
GRANSTPWP54	7/31/2003	50.0	50.0
GRANSTSFW53	7/31/2003	50.0	50.0
GRANSTSFW53S	7/31/2003	50.0	50.0
ICV	7/31/2003	50.0	50.0
LCSD0731C	7/31/2003	50.0	50.0
MAGNADSFW13	7/31/2003	50.0	50.0
MAGNADSFW55	7/31/2003	50.0	50.0
MAGNPDSFW11	7/31/2003	50.0	50.0
MAGNSTPWP02	7/31/2003	50.0	50.0
MAGNSTPWP03	7/31/2003	50.0	50.0
MAGNSTSFW03	7/31/2003	50.0	50.0
PBW0731C	7/31/2003	50.0	50.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
GRANSTPWP53F	8/5/2003	100.0	100.0
GRANSTPWP54F	8/5/2003	100.0	100.0
GRANSTSFW53	8/5/2003	100.0	100.0
GRANSTSFW53D	8/5/2003	100.0	100.0
GRANSTSFW53F	8/5/2003	100.0	100.0
GRANSTSFW53FD	8/5/2003	100.0	100.0
GRANSTSFW53FS	8/5/2003	100.0	100.0
GRANSTSFW53S	8/5/2003	100.0	100.0
LCSW0805C	8/5/2003	100.0	100.0
MAGNADSFW13	8/5/2003	100.0	100.0
MAGNADSFW13F	8/5/2003	100.0	100.0
MAGNADSFW55	8/5/2003	100.0	100.0
MAGNADSFW55F	8/5/2003	100.0	100.0
MAGNPDSFW11	8/5/2003	100.0	100.0
MAGNPDSFW11F	8/5/2003	100.0	100.0
MAGNSTPWP02F	8/5/2003	100.0	100.0
MAGNSTPWP03F	8/5/2003	100.0	100.0
MAGNSTSFW03	8/5/2003	100.0	100.0
MAGNSTSFW03F	8/5/2003	100.0	100.0
PBW0805C	8/5/2003	100.0	100.0

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
GRANSTPWP53F	8/8/2003	100.0	100.0
GRANSTPWP54F	8/8/2003	100.0	100.0
GRANSTSFW53	8/8/2003	100.0	100.0
GRANSTSFW53D	8/8/2003	100.0	100.0
GRANSTSFW53F	8/8/2003	100.0	100.0
GRANSTSFW53FD	8/8/2003	100.0	100.0
GRANSTSFW53FS	8/8/2003	100.0	100.0
GRANSTSFW53S	8/8/2003	100.0	100.0
LCSW0808I	8/8/2003	100.0	100.0
MAGNADSFW13	8/8/2003	100.0	100.0
MAGNADSFW13F	8/8/2003	100.0	100.0
MAGNADSFW55	8/8/2003	100.0	100.0
MAGNADSFW55F	8/8/2003	100.0	100.0
MAGNPDSFW11	8/8/2003	100.0	100.0
MAGNPDSFW11F	8/8/2003	100.0	100.0
MAGNSTPWP02F	8/8/2003	100.0	100.0
MAGNSTPWP03F	8/8/2003	100.0	100.0
MAGNSTSFW03	8/8/2003	100.0	100.0
MAGNSTSFW03F	8/8/2003	100.0	100.0
PBW0808I	8/8/2003	100.0	100.0

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/31/2003 End Date: 7/31/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1728																								X
S10	1.00	1729																								X
S30	1.00	1730																								X
S50	1.00	1731																								X
S100	1.00	1732																								X
S200	1.00	1733																								X
S300	1.00	1734																								X
ICV	1.00	1735																								X
ICB	1.00	1736																								X
LRS	1.00	1737																								X
LRS	1.00	1738																								X
CCV	1.00	1739																								X
CCB	1.00	1740																								X
PBW0731C	1.00	1741																								X
ZZZZZZ	1.00	1742																								
LCSD0731C	1.00	1743																								X
ZZZZZZ	1.00	1744																								
ZZZZZZ	1.00	1745																								
ZZZZZZ	1.00	1746																								
MAGNSTPWP02	1.00	1747																								X
MAGNSTSFW03	1.00	1748																								X
MAGNSTPWP03	1.00	1749																								X
MAGNPDSFW11	1.00	1750																								X
CCV	1.00	1751																								X
CCB	1.00	1752																								X
MAGNADSFW13	1.00	1753																								X
GRANSTPWP54	1.00	1754																								X
GRANSTPWP53	1.00	1755																								X
GRANSTSFW53	1.00	1756																								X
GRANSTSFW53S	1.00	1757																								X
MAGNADSFW55	1.00	1758																								X
ZZZZZZ	1.00	1759																								
ZZZZZZ	1.00	1800																								
ZZZZZZ	1.00	1801																								
ZZZZZZ	1.00	1802																								
CCV	1.00	1803																								X
CCB	1.00	1803																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/8/2003 End Date: 8/8/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1355																X									
S0.2	1.00	1356																X									
S0.5	1.00	1358																X									
S1	1.00	1400																X									
S5	1.00	1402																X									
S10	1.00	1404																X									
ICV	1.00	1406																X									
ICB	1.00	1408																X									
CRA	1.00	1410																X									
CCV	1.00	1411																X									
CCB	1.00	1413																X									
ZZZZZZ	1.00	1415																									
ZZZZZZ	1.00	1417																									
ZZZZZZ	1.00	1418																									
ZZZZZZ	1.00	1420																									
ZZZZZZ	1.00	1422																									
ZZZZZZ	1.00	1424																									
ZZZZZZ	1.00	1425																									
ZZZZZZ	1.00	1427																									
ZZZZZZ	1.00	1429																									
CCV	1.00	1431																X									
CCB	1.00	1433																X									
ZZZZZZ	1.00	1435																									
ZZZZZZ	1.00	1436																									
ZZZZZZ	1.00	1438																									
ZZZZZZ	1.00	1440																									
ZZZZZZ	1.00	1442																									
ZZZZZZ	1.00	1443																									
ZZZZZZ	1.00	1445																									
ZZZZZZ	1.00	1447																									
ZZZZZZ	1.00	1449																									
CCV	1.00	1450																X									
CCB	1.00	1452																X									
ZZZZZZ	1.00	1454																									
PBW0805C	1.00	1455																X									
LCSW0805C	1.00	1458																X									
MAGNSTPWP02F	1.00	1459																X									
MAGNSTSFW03	1.00	1501																X									

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/8/2003 End Date: 8/8/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
MAGNSTSFW03F	1.00	1503																X									
MAGNSTPWP03F	1.00	1505																X									
MAGNPDSFW11	1.00	1507																X									
MAGNPDSFW11F	1.00	1509																X									
CCV	1.00	1510																X									
CCB	1.00	1512																X									
MAGNADSFW13	1.00	1514																X									
MAGNADSFW13F	1.00	1516																X									
GRANSTPWP54F	1.00	1518																X									
GRANSTPWP53F	1.00	1520																X									
GRANSTSFW53	1.00	1522																X									
GRANSTSFW53D	1.00	1524																X									
GRANSTSFW53S	1.00	1525																X									
GRANSTSFW53F	1.00	1527																X									
GRANSTSFW53FD	1.00	1529																X									
CCV	1.00	1530																X									
CCB	1.00	1532																X									
GRANSTSFW53FS	1.00	1535																X									
MAGNADSFW55	1.00	1537																X									
MAGNADSFW55F	1.00	1539																X									
CCV	1.00	1541																X									
CCB	1.00	1543																X									

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 8/22/2003 End Date: 8/22/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0120		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
S	1.00	0125		X						X						X				X			X							
S	1.00	0129			X	X									X															
S	1.00	0133					X	X	X		X	X	X				X		X			X			X	X				
LRS	1.00	0139		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
LRS	1.00	0144		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
LRS	1.00	0149		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
ICV	1.00	0155		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
ICB	1.00	0200		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
ICSA	1.00	0205		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
ICSAB	1.00	0210		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CRI	1.00	0215		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CCV	1.00	0220		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CCB	1.00	0225		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
PBW0808I	1.00	0231		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
LCSW0808I	1.00	0236		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNSTPWP02F	1.00	0241		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNSTSFW03	1.00	0246		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNSTSFW03F	1.00	0251		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNSTPWP03F	1.00	0256		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNPDSFW11	1.00	0301		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNPDSFW11F	1.00	0306		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNADSFW13	1.00	0311		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
MAGNADSFW13F	1.00	0316		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CCV	1.00	0321		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CCB	1.00	0327		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTPWP54F	1.00	0332		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTPWP53F	1.00	0337		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53	1.00	0342		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53L	5.00	0347		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53A	1.00	0352		X	X	X	X	X	X		X	X	X		X		X		X			X			X	X				
GRANSTSFW53D	1.00	0357		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53S	1.00	0402		X	X	X	X	X	X		X	X	X		X		X		X			X			X	X				
GRANSTSFW53F	1.00	0407		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53FL	5.00	0412		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
GRANSTSFW53FA	1.00	0418		X	X	X	X	X	X		X	X	X		X		X		X			X			X	X				
CCV	1.00	0423		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				
CCB	1.00	0428		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X				

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 8/22/2003 End Date: 8/22/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
GRANSTSFW53FD	1.00	0433		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
GRANSTSFW53FS	1.00	0438		X	X	X	X	X	X		X	X	X		X		X		X			X			X	X	
MAGNADSFW55	1.00	0443		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
MAGNADSFW55F	1.00	0448		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
ICSA	1.00	0453		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
ICSAB	1.00	0458		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
CRI	1.00	0504		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
CCV	1.00	0509		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	
CCB	1.00	0514		X	X	X	X	X	X	X	X	X	X		X	X	X		X	X		X	X		X	X	

USEPA - CLP

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW004

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/29/2003 End Date: 8/29/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	0150												X							X			X						
S	1.00	0154												X																
S	1.00	0158																			X			X						
S	1.00	0202																												
LRS	1.00	0206												X							X			X						
LRS	1.00	0210												X							X			X						
LRS	1.00	0215												X							X			X						
ICV	1.00	0219												X							X			X						
ICB	1.00	0223												X							X			X						
ICSA	1.00	0227												X							X			X						
ICSAB	1.00	0231												X							X			X						
CRI	1.00	0235												X							X			X						
CCV	1.00	0239												X							X			X						
CCB	1.00	0244												X							X			X						
PBW0808I	1.00	0248												X							X			X						
LCSW0808I	1.00	0252												X							X			X						
MAGNSTPWP02F	1.00	0256												X							X			X						
MAGNSTSFW03	1.00	0300												X							X			X						
MAGNSTSFW03F	1.00	0304												X							X			X						
MAGNSTPWP03F	1.00	0308												X							X			X						
MAGNPDSFW11	1.00	0312												X							X			X						
MAGNPDSFW11F	1.00	0316												X							X			X						
MAGNADSFW13	1.00	0320												X							X			X						
MAGNADSFW13F	1.00	0324												X							X			X						
CCV	1.00	0328												X							X			X						
CCB	1.00	0333												X							X			X						
GRANSTPWP54F	1.00	0337												X							X			X						
GRANSTPWP53F	1.00	0341												X							X			X						
GRANSTSFW53	1.00	0345												X							X			X						
GRANSTSFW53L	5.00	0349												X							X			X						
GRANSTSFW53A	1.00	0353												X							X			X						
GRANSTSFW53D	1.00	0357												X							X			X						
GRANSTSFW53S	1.00	0401												X							X			X						
GRANSTSFW53F	1.00	0405												X							X			X						
GRANSTSFW53FL	5.00	0410												X							X			X						
GRANSTSFW53FA	1.00	0414												X							X			X						
CCV	1.00	0418												X							X			X						
CCB	1.00	0422												X							X			X						

USEPA - CLP

14

ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW004

Instrument ID Number: TJA ICAP 6 Method: P

Start Date: 8/29/2003 End Date: 8/29/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
GRANSTSFW53FD	1.00	0426												X							X			X			
GRANSTSFW53FS	1.00	0430												X							X			X			
MAGNADSFW55	1.00	0434												X							X			X			
MAGNADSFW55F	1.00	0438												X							X			X			
ICSA	1.00	0442												X							X			X			
ICSAB	1.00	0446												X							X			X			
CRI	1.00	0451												X							X			X			
CCV	1.00	0455												X							X			X			
CCB	1.00	0459												X							X			X			

SEVERN TRENT STL

Geotechnical Analysis
Sample Data Summary Package

EASEAT

GCW004

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNSTSFW03

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535380

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/17/03		mV	1	10	161	

Printed on: 09/08/03 01:58 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNPDSFW11

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535384

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/17/03		mV	1	10	167	

Printed on: 09/08/03 01:59 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNADSFW13

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535386

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/17/03		mV	1	10	193	

Printed on: 09/08/03 01:59 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Duplicate Sample Report Summary

Client Sample No.

GRANSTSFW53REP

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW004

Lab Code: STLVT **Case No.:** 23046 **Lab Sample ID:** 535392DP

Matrix: WATER **Client:** EASEAT **Date Received:** 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	Sample Result Conc.	Sample Result Qual.	Duplicate Sample Result Conc.	Duplicate Sample Result Qual.	RPD*
QSOA	Redox Potential D1498	08/17/03		mV	184		183		1

** Control Limit for RPD is +/- 20%, unless otherwise specified.*

Printed on: 09/08/03 02:00 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.
GRANSTSFW53

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535392

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/17/03		mV	1	10	184	

Printed on: 09/08/03 02:01 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

MAGNADSFW55

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW004

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535394

Matrix: WATER | Client: EASEAT | Date Received: 07/22/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/17/03		mV	1	10	186	

Printed on: 09/08/03 02:01 PM

ASTM Method D1498: Standard Practice for Oxidation-Reduction Potential of Water

Client Code:	EASEAT	**Analysis Date:**	8/17/2003
ETR:	94961	**Analysis Time:**	12:00
SDG:	GCW004	**Analyst:**	MRD

Oxidation-Reduction Potential Probe Calibration Check

Calibration Solution	Reading 1 (mV)	Reading 2 (mV)	Temp. (°C)
100 mL pH 4 buffer + 1.0g Quinhydrone	295	294	18.5
100 mL pH 7 buffer + 1.0g Quinhydrone	121	120	18.5

*Silver/Siver Chloride Reference Electrode used

Field Sample Oxidation-Reduction Potential Determinations

Laboratory Number	Temp. (°C)	Reading 1 (mV)	Reading 2 (mV)	Oxidation-Reduction Potential (ORP) in mV
535380	17.0	161	161	161
535384	17.0	169	165	167
535386	17.0	194	191	193
535392	17.0	184	183	184
535392DP	17.0	183	183	183
535394	17.0	187	185	186

STL Burlington
Colchester, Vermont

Sample Data Summary Package

SDG: GCW009

SEVERN TRENT STL

September 16, 2003

Ms. Jennifer Kindred
EA Engineering
12011 Bellevue-Redmond Rd.
Suite 200
Bellevue, WA 98005

Re: Laboratory Project No. 23046
Case No. 23046; SDG: GCW009

Dear Ms. Kindred:

Enclosed are the analytical results of samples received intact by Severn Trent Laboratories on July 26, 2003. Laboratory numbers have been assigned and designated as follows:

Lab ID	Client Sample ID	Sample Date	Sample Matrix
	Received: 07/26/03 ETR No: 95007		
535945	BLACSTSFW04	07/22/03	Water
535946	BLACSTSFW04F	07/22/03	Water
535947	BLUEPDSFW40	07/20/03	Water
535948	BLUEPDSFW40F	07/20/03	Water
535949	BLUEPDSFW18	07/22/03	Water
535950	BLUEPDSFW18F	07/22/03	Water
535951	BLUEPDSFW16	07/22/03	Water
535952	BLUEPDSFW16F	07/22/03	Water
535953	BLACPDSFW43	07/23/03	Water
535954	BLACPDSFW43F	07/23/03	Water
535955	BLACSTPWP03	07/22/03	Water
535956	BLACSTPWP03F	07/22/03	Water
535957	BLACSTPWR02	07/22/03	Water
535958	BLACSTPWR02F	07/22/03	Water
535959	BLACSTPWP01	07/23/03	Water
535960	BLACSTPWP01F	07/23/03	Water
535961	BLACSTPWR03	07/22/03	Water
535962	BLACSTPWR03F	07/22/03	Water
535963	BLACADSFW11	07/23/03	Water
535964	BLACADSFW11F	07/23/03	Water

Due to reporting software limitations, sample identifications may have been truncated. In most instances only punctuation was removed.

Severn Trent Laboratories, Inc.
STL Burlington • 208 South Park Drive, Suite 1, Colchester, VT 05446
Tel 802 655 1203 Fax 802 655 1248 • *www.stl-inc.com*

A part of Severn Trent plc

Documentation that identifies the condition of the samples at the time of sample receipt and the issues arising at the time of sample log-in is included in the Sample Handling section of this submittal.

The analysis for arsenic speciation was performed by STL's North Canton facility, as approved by EA Engineering. STL North Canton assigned "Lot" numbers as samples were received. Though laboratory numbers may differ, the client's sample identifications were maintained. The results for this delivery group including a case narrative prepared by the North Canton laboratory are attached to the extended data package.

There were no exceptions to quality control criteria noted during the analysis of samples in this delivery group. If there are any questions regarding this submittal, please contact Jeannine McCrumb at (802) 655-1203.

This report shall not be reproduced, except in full, without the written approval of the laboratory. This report is sequentially numbered starting with page 0001 and ending with page 0411.

I certify that this package is in compliance with the NELAC requirements, both technically and for completeness, for other than the conditions detailed above. The release of the data contained in this hardcopy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature.

Sincerely,

Michael F. Wheeler, Ph.D.
Laboratory Director

Enclosure
MFW/jtd/jmm

0001-B LAST ALPHA

SEVERN TRENT **STL**

SEVERN TRENT LABORATORIES, INC.

STL Burlington
208 South Park Drive, Suite 1
Colchester, VT 05446 Tel 802 655 1203

water

CHAIN OF CUSTODY RECORD

Report to:	Invoice to:
Company: EA Engineering	Company: Same
Address: 12011 Bel Red Rd Suite 200 Bellevue, WA 98005	Address:
Contact: Jen Kindred	Contact:
Phone: 425-451-7480	Phone:
Fax: 425-451-7800	Fax:
Contract/ Quote:	

Sampler's Name: Don Norman

Sampler's Signature: Don Norman

Proj. No.: 13890.12 (16) (+M)

Project Name: Granite Creek Watershed

Matrix[1]	Date	Time	Comp	Grab	Identifying Marks of Sample(s)	No/Type of Containers[2] VOA	A/G 1 Lt.	250 ml	P/O	Arsenic Speciation	pH, redox, soy, spec. conduct, sfd	TAL metals - Total	TAL Metals - dissolved	Cyanide	TSS/TDS	TSS/TDS (VR)	Lab/Sample ID (Lab Use Only)
W	7/22	1000		X	BLAC-ST-SFW-04		2	1	2	X	X	X	X	X			
W	7/20	1600		X	BLUE-AD-SFW-40		1	1	3	X	X	X	X	X			
W	7/22	1630		X	BLUE-PD-SFW-18		2	1	2	X	X	X	X	X			
W	7/22	1615		X	BLUE-PD-SFW-16		2	1	2	X	X	X	X	X			
W	7/23	1400		X	BLAC-PD-SFW-43		1	1	6	X	X	X	X	X	X		
W	7/22	1715		X	BLAC-ST-PWR-03			1	1				X	X			
W	7/22	1920		X	BLAC-ST-PWR-02			1	1				X	X			
W	7/23	1200		X	BLAC-ST-PWR-01			1	2	X			X	X			
W	7/22	1730		X	BLAC-ST-PWR-03			1	1				X	X			
W	7/23	1300		X	BLAC-AD-SFW-11		1	1	6	X	X	X	X	X	X		

yr = 03

Lab Use Only
Due Date:

Temp. of coolers when received (C°):
1 | 2 | 3 | 4 | 5

Custody Seal N / Y
Intact N / Y

Screened For Radioactivity ☐

Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time
Relinquished by: (Signature)	Date	Time	Received by: (Signature	Date	Time

Remarks

Client's delivery of samples constitutes acceptance of Severn Trent Laboratories terms and conditions contained in the Price Schedule.

[1]Matrix WW - Wastewater W - Water S - Soil L - Liquid A - Air bag C - Charcoal Tube SL - Sludge O - Oil

[2]Container VOA - 40 ml vial A/G - Amber / Or Glass 1 Liter 250 ml - Glass wide mouth P/O - Plastic or other 500 mL

STL cannot accept verbal changes. Please Fax written changes to (802) 655-1248

STL8234-200 (12/02)

SEVERN TRENT STL

Geotechnical Analysis
Sample Data Summary Package

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTSFW04

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535945

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	147	

Printed on: 09/08/03 04:03 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSFW40

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535947

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	267	

Printed on: 09/08/03 04:04 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSFW18

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW009

Lab Code: STLVT **Case No.:** 23046 **Lab Sample ID:** 535949

Matrix: WATER **Client:** EASEAT **Date Received:** 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	294	

Printed on: 09/08/03 04:05 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSFW16

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535951

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	298	

Printed on: 09/08/03 04:05 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.
BLACPDSFW43

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535953

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	228	

Printed on: 09/08/03 04:06 PM

GEOTECHNICAL / GENERAL CHEMISTRY

Sample Report Summary

Client Sample No.

BLACADSFW11

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535963

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
QSOA	Redox Potential D1498	08/27/03		mV	1	10	232	

Printed on: 09/08/03 04:07 PM

ASTM Method D1498: Standard Practice for Oxidation-Reduction Potential of Water

Client Code:	EASEAT	**Analysis Date:**	8/27/2003
ETR:	95007	**Analysis Time:**	14:40
SDG:	GCW009	**Analyst:**	DJP

Oxidation-Reduction Potential Probe Calibration Check

Calibration Solution	Reading 1 (mV)	Reading 2 (mV)	Temp. (°C)
100 mL pH 4 buffer + 1.0g Quinhydrone	294	292	21.0
100 mL pH 7 buffer + 1.0g Quinhydrone	122	118	21.0

*Silver/Siver Chloride Reference Electrode used

Field Sample Oxidation-Reduction Potential Determinations

Laboratory Number	Temp. (°C)	Reading 1 (mV)	Reading 2 (mV)	Oxidation-Reduction Potential (ORP) in mV
535945	23.0	149	145	147
535947	23.0	264	270	267
535949	23.0	291	297	294
535951	23.0	297	298	298
535953	23.0	231	225	228
535963	23.0	232	232	232

SEVERN TRENT STL

Sample Data Summary Package For Wet Chemistry

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACSTSFW04

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535945

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	113	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	104	
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	59.5	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	59.5	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	1	5.0	6.8	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	8.4	

Printed on: 09/10/03 06:50 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSFW40

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535947

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	163	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	148	
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	6.8	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	6.8	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	5	25.0	63.3	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	5.2	

Printed on: 09/10/03 06:50 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLUEPDSFW18

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535949

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	171	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	228	
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	5.4	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	5.4	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	5	25.0	65.9	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	5.2	

Printed on: 09/10/03 06:50 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLUEPDSFW16

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535951

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	406	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	284	
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.9	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.9	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	10	50.0	193	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	4.8	

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WET CHEMISTRY

Sample Report Summary

Client Sample No.

BLACPDSFW43

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535953

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	170	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	124	
160.1	Total Dissolved Solids	07/30/03	BLKDS0730B	mg/L	1	5.0	105	
160.2	Total Suspended Solids	07/28/03	BLKSS0728E	mg/L	1	0.53	1.8	
160.4	Volatile Suspended Solids	07/28/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	20.2	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	20.2	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	5	25.0	60.1	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	6.1	

Printed on: 09/10/03 06:50 PM

WET CHEMISTRY

Sample Report Summary

Client Sample No.
BLACADSFW11

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046 | Lab Sample ID: 535963

Matrix: WATER | Client: EASEAT | Date Received: 07/26/03

% Solids:

Method	Parameter	Analytical Run Date	Analytical Batch	Units	DF	RL	Conc.	Qual.
120.1	Conductivity (umhos/cm)	08/12/03		umhos/cm	1	0.000	179	
130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	1	2.0	128	
160.1	Total Dissolved Solids	07/30/03	BLKDS0730B	mg/L	1	5.0	209	
160.2	Total Suspended Solids	07/28/03	BLKSS0728E	mg/L	1	0.50	21.7	
160.4	Volatile Suspended Solids	07/28/03		mg/L	1	5.0	5.0	U
310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	1.0	U
310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	35.4	
310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	1	1.0	35.4	
375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	5	25.0	67.4	
9040B	Corrosivity by pH	07/28/03		pH Units	1	0.1	6.6	

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WET CHEMISTRY

Method Blank Report Summary

Lab Name: STL BURLINGTON | Contract: LSO1024805 | SDG No.: GCW009

Lab Code: STLVT | Case No.: 23046

Matrix: WATER | Client: EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Conc.	Units	Qual.	DF	RL	Analytical Run Date	Analytical Batch
BLKAL0730A	310.1	Hydroxide Alkalinity	1.0	mg/L	U	1	1.0	07/30/03	BLKAL0730A
BLKAL0730A	310.1	Carbonate Alkalinity	1.0	mg/L	U	1	1.0	07/30/03	BLKAL0730A
BLKAL0730A	310.1	Bicarbonate Alkalinity	1.0	mg/L	U	1	1.0	07/30/03	BLKAL0730A
BLKAL0730A	310.1	Total Alkalinity	1.0	mg/L	U	1	1.0	07/30/03	BLKAL0730A
BLKDS0730B	160.1	Total Dissolved Solids	5.0	mg/L	U	1	5.0	07/30/03	BLKDS0730B
BLKHA0811A	130.2	Total Hardness as CaCO3	2.0	mg/L	U	1	2.0	08/11/03	BLKHA0811A
BLKSS0728E	160.2	Total Suspended Solids	0.50	mg/L	U	1	0.50	07/28/03	BLKSS0728E
BLKSU0807A	375.4	Sulfate	5.0	mg/L	U	1	5.0	08/07/03	BLKSU0807A

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WET CHEMISTRY

Laboratory Control Sample Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW009

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCS Conc.	True Value	% Recovery*
LCS DS0730B	160.1	Total Dissolved Solids	07/30/03	BLKDS0730B	mg/L	50.0	50.0	100.0
LCSAL0730A	310.1	Hydroxide Alkalinity	07/30/03	BLKAL0730A	mg/L	59.7	54.7000	109.2
LCSAL0730A	310.1	Carbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	59.7	54.7000	109.2
LCSAL0730A	310.1	Bicarbonate Alkalinity	07/30/03	BLKAL0730A	mg/L	59.7	54.7000	109.2
LCSAL0730A	310.1	Total Alkalinity	07/30/03	BLKAL0730A	mg/L	59.7	54.7000	109.2
LCSCD0812A	120.1	Conductivity (umhos/cm)	08/12/03		umhos/c	1000	997.0000	100.3
LCSHA0811A	130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	124	121.0000	102.5
LCSPH0728A	9040B	Corrosivity by pH	07/28/03		pH Units	6.0	6.0000	100.5
LCSSS0728E	160.2	Total Suspended Solids	07/28/03	BLKSS0728E	mg/L	500	500	100.0
LCSSU0807A	375.4	Sulfate	08/07/03	BLKSU0807A	mg/L	9.6	10.0	96.0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*

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WET CHEMISTRY

Laboratory Control Sample Duplicate
Report Summary

Lab Name: STL BURLINGTON **Contract:** LSO1024805 **SDG No.:** GCW009

Lab Code: STLVT **Case No.:** 23046

Matrix: WATER **Client:** EASEAT

% Solids:

Lab Sample ID	Method	Parameter	Analytical Run Date	Analytical Batch	Units	LCSD Conc.	True Value	% Recovery*	RPD**
LCSDHA0811A	130.2	Total Hardness as CaCO3	08/11/03	BLKHA0811A	mg/L	124	121.0000	102.5	0
LCSDPH0728A	9040B	Corrosivity by pH	07/28/03		pH Units	6.0	6.0000	100.3	0

** Control Limit for Percent Recovery is 80-120%, unless otherwise specified.*
*** Control Limit for RPD is +/- 20%, unless otherwise specified.*

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Sample Data Summary Package For Metals

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COVER PAGE - INORGANIC ANALYSES DATA PACKAGE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

SOW No.: ILM04.1

EPA Sample No.	Lab Sample ID.
BLACADSFW11	535963
BLACADSFW11F	535964
BLACPDSFW43	535953
BLACPDSFW43F	535954
BLACSTPWP01	535959
BLACSTPWP01F	535960
BLACSTPWP03	535955
BLACSTPWP03F	535956
BLACSTPWR02	535957
BLACSTPWR02F	535958
BLACSTPWR03	535961
BLACSTPWR03F	535962
BLACSTSFW04	535945
BLACSTSFW04F	535946
BLUEPDSFW16	535951
BLUEPDSFW16F	535952
BLUEPDSFW18	535949
BLUEPDSFW18F	535950
BLUEPDSFW40	535947
BLUEPDSFW40F	535948

Were ICP interelement corrections applied? Yes/No YES

Were ICP background corrections applied? Yes/No YES
If yes-were raw data generated before application of background corrections? Yes/No NO

Comments: _____

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hardcopy data package and in the computer-readable data submitted on diskette has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature.

Signature: _____ Name: _____

Date: _____ Title: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACADSFW11

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535963

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	30.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	7460			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	11.8	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	26000			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	13000			P
7439-96-5	Manganese	2430			P
7439-97-6	Mercury	0.14	B		CV
7440-02-0	Nickel	44.8			P
7440-09-7	Potassium	1440	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2740	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	108			P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture: _____

Color After: colorless Clarity After: clear Artifacts: _____

Comments: _____

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACADSFW11F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535964

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	27.6	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	7390			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	12.0	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	13100			P
7439-92-1	Lead	1.8	B		P
7439-95-4	Magnesium	12900			P
7439-96-5	Manganese	2380			P
7439-97-6	Mercury	0.21			CV
7440-02-0	Nickel	43.2			P
7440-09-7	Potassium	1460	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2820	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	89.3			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACPDSFW43

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535953

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	5.9	U		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	7420			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	231			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	13800			P
7439-96-5	Manganese	101			P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1440	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2810	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	3.7	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACPDSFW43F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535954

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	5.9	U		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	7500			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.6	B		P
7439-89-6	Iron	53.0	B		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	13900			P
7439-96-5	Manganese	188			P
7439-97-6	Mercury	0.20			CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1460	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2800	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	4.9	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPWP01

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535959

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPWP01F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535960

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	36.3	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	23.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	13500			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	7540			P
7439-96-5	Manganese	2.9	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1560	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3420	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	3.0	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

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INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPWP03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535955

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPWP03F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535956

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	18.8	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	11800			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	7000			P
7439-96-5	Manganese	2.8	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1380	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2750	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	2.9	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPWR02

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535957

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: Clarity Before: Texture:

Color After: Clarity After: Artifacts:

Comments:

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-1-

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTPWR02F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535958

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	15.5	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	11400			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	6490			P
7439-96-5	Manganese	0.70	U		P
7439-97-6	Mercury	0.12	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1300	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2580	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	1.9	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPWR03

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535961

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
57-12-5	Cyanide	10.0	U		AS

Color Before: _____ Clarity Before: _____ Texture: _____

Color After: _____ Clarity After: _____ Artifacts: _____

Comments: _____

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTPWR03F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535962

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	23.6	U		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	13.6	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	11300			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	6510			P
7439-96-5	Manganese	0.71	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1210	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2560	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	1.4	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLACSTSFW04

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535945

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	59.0	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	15.1	B		P
7440-41-7	Beryllium	0.30	B		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	11900			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	6880			P
7439-96-5	Manganese	4.2	B		P
7439-97-6	Mercury	0.11	B		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1260	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2620	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	2.8	B		P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLACSTSFW04F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535946

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	24.9	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	14.6	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	11700			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	2.0	U		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	33.3	U		P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	6780			P
7439-96-5	Manganese	2.8	B		P
7439-97-6	Mercury	0.10	U		CV
7440-02-0	Nickel	2.1	U		P
7440-09-7	Potassium	1200	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	2600	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	1.8	B		P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUEPDSFW16

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535951

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	83.5	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	19.9	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	27400			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	30.8	B		P
7440-50-8	Copper	4.3	B		P
7439-89-6	Iron	1920			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	25600			P
7439-96-5	Manganese	4960			P
7439-97-6	Mercury	0.20	B		CV
7440-02-0	Nickel	129			P
7440-09-7	Potassium	1850	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	5680			P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	192			P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUEPDSFW16F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535952

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	68.2	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	19.6	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	27300			P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	30.6	B		P
7440-50-8	Copper	2.9	B		P
7439-89-6	Iron	1310			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	25500			P
7439-96-5	Manganese	4930			P
7439-97-6	Mercury	0.27			CV
7440-02-0	Nickel	126			P
7440-09-7	Potassium	1860	B		P
7782-49-2	Selenium	3.4	B		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	5780			P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	192			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.
BLUEPDSFW18

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535949

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	225			P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	9.4	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	4470	B		P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	35.3	B		P
7440-50-8	Copper	3.4	B		P
7439-89-6	Iron	17400			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	11400			P
7439-96-5	Manganese	4980			P
7439-97-6	Mercury	0.30			CV
7440-02-0	Nickel	112			P
7440-09-7	Potassium	1340	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3080	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	210			P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUEPDSFW18F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535950

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	87.2	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	9.0	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.71	B		P
7440-70-2	Calcium	4370	B		P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	35.0	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	6740			P
7439-92-1	Lead	1.4	B		P
7439-95-4	Magnesium	11100			P
7439-96-5	Manganese	4860			P
7439-97-6	Mercury	0.24			CV
7440-02-0	Nickel	108			P
7440-09-7	Potassium	1310	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3270	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	204			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUEPDSFW40

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535947

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	614			P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	9.7	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	4350	B		P
7440-47-3	Chromium	5.0	B		P
7440-48-4	Cobalt	34.0	B		P
7440-50-8	Copper	8.7	B		P
7439-89-6	Iron	37500			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	11000			P
7439-96-5	Manganese	4750			P
7439-97-6	Mercury	0.38			CV
7440-02-0	Nickel	108			P
7440-09-7	Potassium	1330	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3080	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	202			P
57-12-5	Cyanide	10.0	U		AS

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

INORGANIC ANALYSES DATA SHEET

EPA SAMPLE NO.

BLUEPDSFW40F

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Lab Sample ID: 535948

Level (low/med): LOW Date Received: 7/26/2003

% Solids: 0.0

Concentration Units (ug/L or mg/kg dry weight): UG/L

CAS No.	Analyte	Concentration	C	Q	M
7429-90-5	Aluminum	77.8	B		P
7440-36-0	Antimony	4.7	U		P
7440-38-2	Arsenic	4.8	U		P
7440-39-3	Barium	9.3	B		P
7440-41-7	Beryllium	0.20	U		P
7440-43-9	Cadmium	0.60	U		P
7440-70-2	Calcium	4400	B		P
7440-47-3	Chromium	1.4	U		P
7440-48-4	Cobalt	34.8	B		P
7440-50-8	Copper	2.4	U		P
7439-89-6	Iron	7340			P
7439-92-1	Lead	1.3	U		P
7439-95-4	Magnesium	11100			P
7439-96-5	Manganese	4790			P
7439-97-6	Mercury	0.23			CV
7440-02-0	Nickel	106			P
7440-09-7	Potassium	1340	B		P
7782-49-2	Selenium	3.4	U		P
7440-22-4	Silver	2.2	U		P
7440-23-5	Sodium	3090	B		P
7440-28-0	Thallium	5.7	U		P
7440-62-2	Vanadium	2.0	U		P
7440-66-6	Zinc	198			P

Color Before: colorless Clarity Before: clear Texture:

Color After: colorless Clarity After: clear Artifacts:

Comments:

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Aluminum	26000.0	26230.00	100.9	30200.0	29630.00	98.1	29460.00	97.5	P
Antimony	250.0	249.10	99.6	300.0	295.50	98.5	297.70	99.2	P
Arsenic	250.0	246.40	98.6	100.0	96.40	96.4	99.72	99.7	P
Barium	500.0	490.30	98.1	200.0	194.70	97.4	193.60	96.8	P
Beryllium	500.0	497.50	99.5	100.0	95.69	95.7	96.31	96.3	P
Cadmium	500.0	489.00	97.8	100.0	94.45	94.4	94.64	94.6	P
Calcium	25000.0	25290.00	101.2	30200.0	29290.00	97.0	29210.00	96.7	P
Chromium	500.0	494.50	98.9	200.0	190.40	95.2	190.60	95.3	P
Cobalt	500.0	488.30	97.7	200.0	191.80	95.9	193.10	96.6	P
Copper	500.0	497.60	99.5	200.0	196.80	98.4	195.50	97.8	P
Iron	25500.0	26210.00	102.8	30200.0	29400.00	97.4	29480.00	97.6	P
Lead	1000.0	995.10	99.5	400.0	383.10	95.8	385.90	96.5	P
Magnesium	25000.0	25330.00	101.3	30200.0	29130.00	96.5	29310.00	97.1	P
Manganese	500.0	490.80	98.2	200.0	192.50	96.2	193.40	96.7	P
Mercury	3.0	3.01	100.3	5.0	5.48	109.6	5.35	107.0	CV
Nickel	500.0	491.80	98.4	200.0	188.20	94.1	189.60	94.8	P
Potassium	25000.0	26500.00	106.0	30200.0	30880.00	102.3	30670.00	101.6	P
Selenium	250.0	242.20	96.9	100.0	94.93	94.9	97.41	97.4	P
Silver	500.0	495.20	99.0	100.0	96.59	96.6	97.68	97.7	P
Sodium	25000.0	25120.00	100.5	30200.0	29090.00	96.3	29180.00	96.6	P
Thallium	250.0	242.10	96.8	100.0	98.75	98.8	98.04	98.0	P
Vanadium	500.0	492.40	98.5	200.0	193.50	96.8	194.10	97.0	P
Zinc	500.0	495.30	99.1	200.0	193.50	96.8	194.60	97.3	P
Cyanide	120.0	113.10	94.2	150.0	145.09	96.7	144.62	96.4	AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	M
Aluminum				30200.0	29440.00	97.5	29540.00	97.8	P
Antimony				300.0	297.20	99.1	298.60	99.5	P
Arsenic				100.0	98.70	98.7	97.19	97.2	P
Barium				200.0	194.00	97.0	193.60	96.8	P
Beryllium				100.0	96.20	96.2	96.41	96.4	P
Cadmium				100.0	94.04	94.0	94.41	94.4	P
Calcium				30200.0	29140.00	96.5	29460.00	97.5	P
Chromium				200.0	190.50	95.2	191.10	95.6	P
Cobalt				200.0	193.10	96.6	193.80	96.9	P
Copper				200.0	196.10	98.0	196.10	98.0	P
Iron				30200.0	29510.00	97.7	29610.00	98.0	P
Lead				400.0	387.60	96.9	389.40	97.4	P
Magnesium				30200.0	29240.00	96.8	29400.00	97.4	P
Manganese				200.0	193.50	96.8	193.50	96.8	P
Mercury				5.0	5.45	109.0	5.29	105.8	CV
Nickel				200.0	190.20	95.1	191.00	95.5	P
Potassium				30200.0	30710.00	101.7	30660.00	101.5	P
Selenium				100.0	94.74	94.7	97.19	97.2	P
Silver				100.0	95.78	95.8	97.09	97.1	P
Sodium				30200.0	29220.00	96.8	29010.00	96.1	P
Thallium				100.0	98.44	98.4	99.39	99.4	P
Vanadium				200.0	194.20	97.1	194.30	97.2	P
Zinc				200.0	194.30	97.2	194.50	97.2	P
Cyanide				150.0	147.23	98.2			AS

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead	1000.0	985.70	98.6	400.0	390.20	97.6	388.80	97.2	P
Selenium	250.0	243.20	97.3	100.0	98.11	98.1	98.32	98.3	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2A
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Initial Calibration Source: Inorganic Ventures/Fisher

Continuing Calibration Source: SPEX/Fisher

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					M
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Lead				400.0	388.10	97.0	389.60	97.4	P
Selenium				100.0	96.48	96.5	98.39	98.4	P

(1) Control Limits: Mercury 80-120; Other Metals 90-110; Cyanide 85-115

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Found	%R	Final Found	%R
Aluminum				400.0	520.80	130.2	517.40	129.4
Antimony				120.0	119.20	99.3	121.60	101.3
Arsenic				20.0	19.33	96.6	17.24	86.2
Barium				400.0	386.30	96.6	388.00	97.0
Beryllium				10.0	9.99	99.9	9.87	98.7
Cadmium				10.0	9.83	98.3	9.46	94.6
Calcium				10000.0	10260.00	102.6	10160.00	101.6
Chromium				20.0	24.56	122.8	29.51	147.6
Cobalt				100.0	96.37	96.4	95.62	95.6
Copper				50.0	50.93	101.9	51.15	102.3
Iron				200.0	268.90	134.4	279.10	139.6
Lead				6.0	5.36	89.3	4.54	75.7
Magnesium				10000.0	10050.00	100.5	9947.00	99.5
Manganese				30.0	33.32	111.1	31.57	105.2
Mercury	0.2	0.26	130.0					
Nickel				80.0	106.40	133.0	96.67	120.8
Potassium				10000.0	10760.00	107.6	10800.00	108.0
Selenium				10.0	11.09	110.9	11.59	115.9
Silver				20.0	19.19	96.0	19.17	95.8
Sodium				10000.0	9713.00	97.1	9685.00	96.8
Thallium				20.0	19.32	96.6	19.68	98.4
Vanadium				100.0	97.23	97.2	95.93	95.9
Zinc				40.0	40.07	100.2	39.85	99.6

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

2B-IN

CRDL STANDARD FOR AA AND ICP

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

AA CRDL Standard Source: Inorganic Ventures

ICP CRDL Standard Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True	Found	%R	CRDL Standard for ICP Initial True	Found	%R	Final Found	%R
Lead				6.0	6.69	111.5	5.56	92.7
Selenium				10.0	10.36	103.6	10.69	106.9

Control Limits: no limits have been established by EPA at this time

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum	23.6	U	23.6	U	23.6	U	23.6	U	23.600	U	P
Antimony	4.7	U	4.7	U	4.7	U	4.7	U	4.700	U	P
Arsenic	4.8	U	4.8	U	4.8	U	4.8	U	4.800	U	P
Barium	5.9	U	5.9	U	5.9	U	5.9	U	5.900	U	P
Beryllium	0.2	U	0.2	U	0.2	U	0.2	U	0.200	U	P
Cadmium	0.6	U	0.6	U	0.6	U	0.6	U	0.600	U	P
Calcium	182.1	U	182.1	U	182.1	U	182.1	U	182.100	U	P
Chromium	-3.1	B	-2.7	B	-3.2	B	-3.1	B	-2.813	B	P
Cobalt	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Copper	2.4	U	2.4	U	2.4	U	2.4	U	2.400	U	P
Iron	-33.3	B	33.3	U	33.3	U	-35.0	B	33.300	U	P
Lead	1.3	U	1.3	U	1.3	U	-1.8	B	1.300	U	P
Magnesium	178.3	U	178.3	U	178.3	U	178.3	U	178.300	U	P
Manganese	0.7	U	0.7	U	0.7	U	0.7	U	0.700	U	P
Mercury	0.1	B	0.1	B	0.2	B	0.1	B	0.100	U	CV
Nickel	-3.4	B	-3.0	B	-3.7	B	-2.8	B	-3.736	B	P
Potassium	393.0	U	393.0	U	393.0	U	393.0	U	393.000	U	P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U	3.400	U	P
Silver	2.2	U	2.2	U	2.2	U	2.2	U	2.200	U	P
Sodium	472.7	U	472.7	U	472.7	U	472.7	U	472.700	U	P
Thallium	5.7	U	5.7	U	5.7	U	5.7	U	5.700	U	P
Vanadium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	2.354	B	P
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	AS

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Aluminum			23.6	U							P
Antimony			4.7	U							P
Arsenic			4.8	U							P
Barium			5.9	U							P
Beryllium			0.2	U							P
Cadmium			0.6	U							P
Calcium			182.1	U							P
Chromium			-3.1	B							P
Cobalt			2.0	U							P
Copper			2.4	U							P
Iron			33.3	U							P
Lead			1.3	U							P
Magnesium			178.3	U							P
Manganese			0.7	U							P
Mercury			0.1	U							CV
Nickel			-3.2	B							P
Potassium			393.0	U							P
Selenium			3.4	U							P
Silver			2.2	U							P
Sodium			472.7	U							P
Thallium			5.7	U							P
Vanadium			2.0	U							P
Zinc			1.0	U							P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead	1.3	U	1.3	U	1.3	U	1.3	U			P
Selenium	3.4	U	3.4	U	3.4	U	3.4	U			P

USEPA - CLP

3

BLANKS

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	M
Lead			1.4	B							P
Selenium			3.4	U							P

4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Aluminum	500000	482740	493200	486900.0	100.9	490000	485200.0	100.5
Antimony	0	596	-1	602.5	101.1	-3	598.1	100.4
Arsenic	0	102	3	97.6	95.7	3	101.8	99.8
Barium	0	503	2	487.2	96.9	2	484.9	96.4
Beryllium	0	482	0	464.1	96.3	0	470.7	97.7
Cadmium	0	938	-1	901.0	96.1	-1	906.6	96.7
Calcium	500000	477840	482600	474100.0	99.2	474500	478900.0	100.2
Chromium	0	483	1	463.2	95.9	0	468.2	96.9
Cobalt	0	457	-1	444.0	97.2	-1	452.0	98.9
Copper	0	526	4	499.2	94.9	4	499.7	95.0
Iron	200000	191980	198400	192700.0	100.4	196000	194900.0	101.5
Lead	0	49	-1	45.9	93.7	-2	45.1	92.0
Magnesium	500000	521880	531500	521400.0	99.9	522400	529300.0	101.4
Manganese	0	474	1	458.1	96.6	1	462.9	97.7
Nickel	0	952	-2	922.8	96.9	-2	934.5	98.2
Potassium	0	0	74	-17.4		-8	52.4	
Selenium	0	47	1	43.9	93.4	-1	43.3	92.1
Silver	0	213	0	206.5	96.9	0	207.0	97.2
Sodium	0	0	-403	-318.4		-409	-297.9	
Thallium	0	89	-5	84.9	95.4	-6	89.3	100.3
Vanadium	0	478	3	458.3	95.9	3	462.3	96.7
Zinc	0	998	3	970.6	97.3	3	978.0	98.0

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4

ICP INTERFERENCE CHECK SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

ICP ID Number: TJA ICAP 4 ICS Source: Inorganic Ventures

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol.A	Sol.AB	Sol.A	Sol.AB	%R	Sol.A	Sol.AB	%R
Lead	0	49	-3	45.1	92.0	1	43.9	89.6
Selenium	0	47	-9	39.3	83.6	-7	43.4	92.3

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	51000.0	50940.00	99.9						
Antimony	2000.0	2030.00	101.5						
Arsenic	1050.0	1043.00	99.3						
Barium	500.0	494.10	98.8						
Beryllium	500.0	492.20	98.4						
Cadmium	525.0	504.60	96.1						
Calcium	50000.0	49840.00	99.7						
Chromium	500.0	502.60	100.5						
Cobalt	500.0	485.90	97.2						
Copper	500.0	505.80	101.2						
Iron	50500.0	51230.00	101.4						
Lead	1015.0	1000.00	98.5						
Magnesium	50000.0	50090.00	100.2						
Manganese	500.0	491.30	98.3						
Mercury	1.0	0.96	96.0						
Nickel	500.0	495.30	99.1						
Potassium	50000.0	49770.00	99.5						
Selenium	525.0	491.20	93.6						
Silver	500.0	414.90	83.0						
Sodium	50000.0	51030.00	102.1						
Thallium	550.0	529.10	96.2						
Vanadium	500.0	500.50	100.1						
Zinc	500.0	490.50	98.1						
Cyanide	120.0	114.80	95.7						

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LABORATORY CONTROL SAMPLE

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Solid LCS Source: _____

Aqueous LCS Source: Inorganic Ventures

Analyte	Aqueous (ug/L) True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Aluminum	51000.0	50390.00	98.8						
Antimony	2000.0	1979.00	99.0						
Arsenic	1050.0	1015.00	96.7						
Barium	500.0	489.10	97.8						
Beryllium	500.0	479.60	95.9						
Cadmium	525.0	490.00	93.3						
Calcium	50000.0	48650.00	97.3						
Chromium	500.0	493.10	98.6						
Cobalt	500.0	474.00	94.8						
Copper	500.0	500.50	100.1						
Iron	50500.0	49990.00	99.0						
Lead	1015.0	970.90	95.7						
Magnesium	50000.0	48810.00	97.6						
Manganese	500.0	481.30	96.3						
Mercury	1.0	1.12	112.0						
Nickel	500.0	485.30	97.1						
Potassium	50000.0	49570.00	99.1						
Selenium	525.0	484.20	92.2						
Silver	500.0	410.00	82.0						
Sodium	50000.0	50470.00	100.9						
Thallium	550.0	514.70	93.6						
Vanadium	500.0	489.60	97.9						
Zinc	500.0	477.90	95.6						
Cyanide	120.0	116.06	96.7						

9
ICP SERIAL DILUTIONS

SAMPLE NO.

BLACSTSFW04L

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Matrix (soil/water): WATER Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Difference	Q	M
Aluminum	58.95	B	118.00	U	100.0		P
Antimony	4.70	U	23.50	U			P
Arsenic	4.80	U	24.00	U			P
Barium	15.11	B	29.50	U	100.0		P
Beryllium	0.30	B	1.00	U	100.0		P
Cadmium	0.60	U	3.00	U			P
Calcium	11880.00		11850.00	B	0.3		P
Chromium	1.40	U	7.00	U			P
Cobalt	2.00	U	10.00	U			P
Copper	2.40	U	12.00	U			P
Iron	33.30	U	166.50	U			P
Lead	1.30	U	6.50	U			P
Magnesium	6885.00		6871.00	B	0.2		P
Manganese	4.24	B	4.81	B	13.4		P
Nickel	2.10	U	10.50	U			P
Potassium	1264.00	B	1965.00	U	100.0		P
Selenium	3.40	U	17.00	U			P
Silver	2.20	U	11.00	U			P
Sodium	2616.00	B	2363.50	U	100.0		P
Thallium	5.70	U	28.50	U			P
Vanadium	2.00	U	10.00	U			P
Zinc	2.78	B	14.20	B	410.8		P

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

ICP ID Number: Date: 7/1/2003

Flame AA ID Number: Lachat Cyanide

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Cyanide			10	10.0	AS

Comments:

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10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

ICP ID Number: _____ Date: 7/1/2003

Flame AA ID Number: Leeman Hydra AA

Furnace AA ID Number: _____

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Mercury	253.70		0.2	0.10	CV

Comments: _____

10

INSTRUMENT DETECTION LIMITS (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Flame AA ID Number:

Furnace AA ID Number:

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Lead	220.353		3	1.3	P
Selenium	196.026		5	3.4	P

Comments:

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for: Al	Ca	Fe	Mg	Ba
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	-0.0000600	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0008950	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000330	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0004320
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Lead	220.35	0.0006300	0.0000000	0.0000090	0.0000000	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000200	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	-0.0000220	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0000200	0.0000000	-0.0000900	0.0000000	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000490	0.0000000	0.0000000
Zinc	213.86	0.0000250	0.0000000	0.0000630	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Co	Cr	Cu	Mn	Mo
Aluminum	308.22	0.0000000	0.0000000	0.0000000	0.0000000	0.0072400
Antimony	206.84	0.0000000	0.0111600	0.0000000	0.0000000	-0.0024800
Arsenic	189.04	0.0000000	0.0004700	0.0000000	0.0000000	0.0013380
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0001150	0.0000000	0.0000000	0.0000000	0.0001350
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	-0.0016380
Copper	324.75	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Iron	271.44	0.1059800	0.0000000	0.0000000	0.0000000	0.0036200
Lead	220.35	-0.0022600	-0.0001190	0.0000000	0.0000000	-0.0007540
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	-0.0004300	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	-0.0038600	0.0000000	0.0000000	-0.0042750
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	-0.0007920
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Thallium	190.86	0.0032700	0.0002540	0.0000000	-0.008140	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	-0.0160000
Zinc	213.86	0.0000000	0.0000000	0.0003300	0.0000000	0.0000000

Comments: _____

11A
ICP INTERELEMENT CORRECTION FACTORS (ANNUALLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

ICP ID Number: TJA ICAP 4 Date: 6/30/2003

Analyte	Wave-length (nm)	Interelement Correction Factors for:				
		Ni	Sb	Sn	V	Zn
Aluminum	308.22	0.0000000	0.0000000	0.1440400	0.0000000	0.0000000
Antimony	206.84	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Arsenic	189.04	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Barium	493.41	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Beryllium	313.04	0.0000000	0.0000000	0.0000000	0.0006280	0.0000000
Boron	249.68	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cadmium	226.50	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Calcium	317.93	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Chromium	267.72	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Cobalt	228.62	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Copper	324.75	0.0000000	0.0000000	0.0000000	-0.000192	0.0000000
Iron	271.44	0.0000000	0.0000000	0.0000000	0.0237000	0.0000000
Lead	220.35	0.0001240	-0.0002280	0.0000000	0.0005020	0.0000000
Magnesium	279.08	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Manganese	257.61	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Molybdenum	202.03	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Nickel	231.60	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Potassium	766.49	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Selenium	196.03	0.0000000	0.0001660	0.0000000	0.0000000	0.0000000
Silicon	288.16	0.0000000	0.0000000	-0.1212200	0.0000000	0.0000000
Silver	328.07	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Sodium	330.23	0.0000000	0.0000000	0.0000000	0.0000000	0.1177000
Thallium	190.86	0.0000000	0.0000000	0.0000000	0.0025400	0.0000000
Tin	189.99	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Vanadium	292.40	0.0000000	0.0000000	0.0000000	0.0000000	0.0000000
Zinc	213.86	0.0052400	0.0000000	0.0000000	0.0000000	0.0000000

Comments: _____

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12
ICP LINEAR RANGES (QUARTERLY)

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

ICP ID Number: TJA ICAP 4 Date: 7/1/2003

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	M
Lead	10.00	10000.0	P
Selenium	10.00	5000.0	P

Comments:

USEPA - CLP

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Method: AS

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLACADSFW11	7/31/2003	50.0	50.0
BLACPDSFW43	7/31/2003	50.0	50.0
BLACSTPWP01	7/31/2003	50.0	50.0
BLACSTPWP03	7/31/2003	50.0	50.0
BLACSTPWR02	7/31/2003	50.0	50.0
BLACSTPWR03	7/31/2003	50.0	50.0
BLACSTSFW04	7/31/2003	50.0	50.0
BLUEPDSFW16	7/31/2003	50.0	50.0
BLUEPDSFW18	7/31/2003	50.0	50.0
BLUEPDSFW40	7/31/2003	50.0	50.0
ICV	7/31/2003	50.0	50.0
LCS0731A	7/31/2003	50.0	50.0
LCSD0731A	7/31/2003	50.0	50.0
PBW0731A	7/31/2003	50.0	50.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Method: CV

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLACADSFW11	8/5/2003	100.0	100.0
BLACADSFW11F	8/5/2003	100.0	100.0
BLACPDSFW43	8/5/2003	100.0	100.0
BLACPDSFW43F	8/5/2003	100.0	100.0
BLACSTPWP01F	8/5/2003	100.0	100.0
BLACSTPWP03F	8/5/2003	100.0	100.0
BLACSTPWR02F	8/5/2003	100.0	100.0
BLACSTPWR03F	8/5/2003	100.0	100.0
BLACSTSFW04	8/5/2003	100.0	100.0
BLACSTSFW04F	8/5/2003	100.0	100.0
BLUEPDSFW16	8/5/2003	100.0	100.0
BLUEPDSFW16F	8/5/2003	100.0	100.0
BLUEPDSFW18	8/5/2003	100.0	100.0
BLUEPDSFW18F	8/5/2003	100.0	100.0
BLUEPDSFW40	8/5/2003	100.0	100.0
BLUEPDSFW40F	8/5/2003	100.0	100.0
LCSDW0805F	8/5/2003	100.0	100.0
LCSW0805F	8/5/2003	100.0	100.0
PBW0805F	8/5/2003	100.0	100.0

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PREPARATION LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Method: P

EPA Sample No.	Preparation Date	Initial Volume mL	Volume (mL)
BLACADSFW11	8/8/2003	100.0	100.0
BLACADSFW11F	8/8/2003	100.0	100.0
BLACPDSFW43	8/8/2003	100.0	100.0
BLACPDSFW43F	8/8/2003	100.0	100.0
BLACSTPWP01F	8/8/2003	100.0	100.0
BLACSTPWP03F	8/8/2003	100.0	100.0
BLACSTPWR02F	8/8/2003	100.0	100.0
BLACSTPWR03F	8/8/2003	100.0	100.0
BLACSTSFW04	8/8/2003	100.0	100.0
BLACSTSFW04F	8/8/2003	100.0	100.0
BLUEPDSFW16	8/8/2003	100.0	100.0
BLUEPDSFW16F	8/8/2003	100.0	100.0
BLUEPDSFW18	8/8/2003	100.0	100.0
BLUEPDSFW18F	8/8/2003	100.0	100.0
BLUEPDSFW40	8/8/2003	100.0	100.0
BLUEPDSFW40F	8/8/2003	100.0	100.0
LCSDW0808H	8/8/2003	100.0	100.0
LCSW0808H	8/8/2003	100.0	100.0
PBW0808H	8/8/2003	100.0	100.0

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Instrument ID Number: Lachat Cyanide QC8000 Method: AS

Start Date: 7/31/2003 End Date: 7/31/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
S0	1.00	1336																								X
S10	1.00	1337																								X
S30	1.00	1338																								X
S50	1.00	1339																								X
S100	1.00	1340																								X
S200	1.00	1341																								X
S300	1.00	1342																								X
ICV	1.00	1343																								X
ICB	1.00	1344																								X
LRS	1.00	1345																								X
LRS	1.00	1346																								X
CCV	1.00	1347																								X
CCB	1.00	1348																								X
PBW0731A	1.00	1349																								X
ZZZZZZ	1.00	1350																								
LCS0731A	1.00	1351																								X
ZZZZZZ	1.00	1352																								
LCSD0731A	1.00	1353																								X
ZZZZZZ	1.00	1354																								
ZZZZZZ	1.00	1355																								
ZZZZZZ	1.00	1356																								
ZZZZZZ	1.00	1357																								
ZZZZZZ	1.00	1358																								
CCV	1.00	1359																								X
CCB	1.00	1400																								X
BLACSTSFW04	1.00	1401																								X
BLUEPDSFW40	1.00	1402																								X
BLUEPDSFW18	1.00	1403																								X
BLUEPDSFW16	1.00	1404																								X
BLACPDSFW43	1.00	1405																								X
BLACSTPWP03	1.00	1406																								X
BLACSTPWR02	1.00	1407																								X
BLACSTPWP01	1.00	1408																								X
BLACSTPWR03	1.00	1409																								X
BLACADSFW11	1.00	1410																								X
CCV	1.00	1411																								X
CCB	1.00	1411																								X

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/11/2003 End Date: 9/11/2003

EPA Sample No.	D/F	Time	% R	Analytes																									
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN		
S0	1.00	1719													X						X								
S	1.00	1723																											
S	1.00	1727													X						X								
S	1.00	1730																											
LRS	1.00	1736													X						X								
LRS	1.00	1740													X						X								
LRS	1.00	1745													X						X								
ICV	1.00	1750													X						X								
ICB	1.00	1755													X						X								
ICSA	1.00	1759													X						X								
ICSAB	1.00	1804													X						X								
CRI	1.00	1809													X						X								
CCV	1.00	1814													X						X								
CCB	1.00	1818													X						X								
ZZZZZZ	1.00	1823																											
ZZZZZZ	1.00	1828																											
ZZZZZZ	1.00	1832																											
ZZZZZZ	1.00	1837																											
ZZZZZZ	5.00	1842																											
ZZZZZZ	1.00	1846																											
ZZZZZZ	1.00	1851																											
ZZZZZZ	1.00	1856																											
ZZZZZZ	1.00	1900																											
ZZZZZZ	1.00	1905																											
CCV	1.00	1910													X						X								
CCB	1.00	1914													X						X								
ZZZZZZ	1.00	1919																											
ZZZZZZ	1.00	1924																											
ZZZZZZ	1.00	1929																											
ZZZZZZ	1.00	1933																											
ZZZZZZ	5.00	1938																											
ZZZZZZ	1.00	1943																											
ZZZZZZ	1.00	1947																											
ZZZZZZ	1.00	1952																											
ZZZZZZ	1.00	1957																											
ZZZZZZ	5.00	2001																											
CCV	1.00	2006													X						X								
CCB	1.00	2011													X						X								

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/11/2003 End Date: 9/11/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	2015																										
BLACSTPWR03F	1.00	2020																			X							
BLACADSFW11	1.00	2025													X													
ICSA	1.00	2029													X						X							
ICSAB	1.00	2034													X						X							
CRI	1.00	2039													X						X							
CCV	1.00	2044													X						X							
CCB	1.00	2048													X						X							

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/13/2003 End Date: 8/13/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	2131																X												
S0.2	1.00	2132																X												
S0.5	1.00	2134																X												
S1	1.00	2136																X												
S5	1.00	2138																X												
S10	1.00	2140																X												
ICV	1.00	2141																X												
ICB	1.00	2143																X												
CRA	1.00	2145																X												
CCV	1.00	2147																X												
CCB	1.00	2148																X												
PBW0805F	1.00	2150																X												
LCSW0805F	1.00	2152																X												
LCSDW0805F	1.00	2154																X												
BLACSTSFW04	1.00	2156																X												
BLACSTSFW04F	1.00	2158																X												
BLUEPDSFW40	1.00	2159																X												
BLUEPDSFW40F	1.00	2201																X												
BLUEPDSFW18	1.00	2203																X												
BLUEPDSFW18F	1.00	2205																X												
CCV	1.00	2207																X												
CCB	1.00	2208																X												
BLUEPDSFW16	1.00	2210																X												
BLUEPDSFW16F	1.00	2212																X												
BLACPDSFW43	1.00	2214																X												
BLACPDSFW43F	1.00	2215																X												
BLACSTPWP03F	1.00	2217																X												
BLACSTPWR02F	1.00	2219																X												
BLACSTPWP01F	1.00	2221																X												
BLACSTPWR03F	1.00	2223																X												
BLACADSFW11	1.00	2225																X												
CCV	1.00	2227																X												
CCB	1.00	2228																X												
BLACADSFW11F	1.00	2230																X												
ZZZZZZ	1.00	2232																												
ZZZZZZ	1.00	2234																												
ZZZZZZ	1.00	2236																												
ZZZZZZ	1.00	2237																												

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: SDG No.: GCW009

Instrument ID Number: Leeman Hydra AA Method: CV

Start Date: 8/13/2003 End Date: 8/13/2003

EPA Sample No.	D/F	Time	% R	Analytes																								
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN
ZZZZZZ	1.00	2239																										
ZZZZZZ	1.00	2241																										
ZZZZZZ	1.00	2243																										
ZZZZZZ	1.00	2245																										
CCV	1.00	2247																X										
CCB	1.00	2249																X										

USEPA - CLP

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/7/2003 End Date: 9/7/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN			
S0	1.00	1935		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
S	1.00	1940		X						X				X		X				X			X						
S	1.00	1944			X	X									X						X			X					
S	1.00	1948					X	X	X		X	X	X				X		X			X			X	X			
LRS	1.00	1953		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LRS	1.00	1958		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LRS	1.00	2004		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICV	1.00	2009		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICB	1.00	2014		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSA	1.00	2019		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
ICSAB	1.00	2024		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CRI	1.00	2029		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	2034		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	2039		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
PBW0808H	1.00	2045		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSW0808H	1.00	2050		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
LCSDW0808H	1.00	2055		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTSFW04	1.00	2100		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTSFW04L	5.00	2105		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTSFW04F	1.00	2110		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW40	1.00	2115		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW40F	1.00	2120		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW18	1.00	2125		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW18F	1.00	2130		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	2135		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	2140		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW16	1.00	2145		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLUEPDSFW16F	1.00	2150		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACPDSFW43	1.00	2155		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACPDSFW43F	1.00	2200		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTPWP03F	1.00	2205		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTPWR02F	1.00	2210		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTPWP01F	1.00	2216		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
BLACSTPWR03F	1.00	2221		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X			
BLACADSFW11	1.00	2226		X	X	X	X	X	X	X	X	X	X	X		X	X		X	X	X	X	X	X	X	X			
BLACADSFW11F	1.00	2231		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCV	1.00	2236		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			
CCB	1.00	2241		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X			

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ANALYSIS RUN LOG

Lab Name: STL BURLINGTON Contract: 23046

Lab Code: STLVT Case No.: 23046 SAS No.: _____ SDG No.: GCW009

Instrument ID Number: TJA ICAP 4 Method: P

Start Date: 9/7/2003 End Date: 9/7/2003

EPA Sample No.	D/F	Time	% R	Analytes																										
				AL	SB	AS	BA	BE	CD	CA	CR	CO	CU	FE	PB	MG	MN	HG	NI	K	SE	AG	NA	TL	V	ZN	CN				
ICSA	1.00	2246		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					
ICSAB	1.00	2251		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					
CRI	1.00	2256		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					
CCV	1.00	2301		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					
CCB	1.00	2307		X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X	X	X					

ABA Data

BC RESEARCH Inc.

BC Research Inc., BC Research and Innovation Complex, 3650 Wesbrook Mall, Vancouver, BC, Canada V6S 2L2
Telephone: (604) 224-4331 • Facsimile: (604) 224-0540 • Email: info@bcresearch.com • Website: bcresearch.com

Table 1: Modified ABA Results for STL Burlington Samples Batch 3 - Received July 29, 2003

Sample	Paste pH	Total Sulphur (Wt.%)	Sulphate Sulphur (Wt.%)	Sulphide Sulphur* (Wt.%)	Maximum Potential Acidity** (Kg CaCO3/Tonne)	Neutralization Potential (Kg CaCO3/Tonne)	Net Neutralization Potential (Kg CaCO3/Tonne)	Fizz Rating
AJAX-WP-SUS-08-1.2	7.8	0.74	0.01	0.73	22.8	72.5	49.7	slight
AJAX-WP-SUS-09-1.0	8.2	0.57	<0.01	0.57	17.8	83.8	66.0	slight
AJAX-WP-SUS-10-2.0	4.1	0.09	0.06	0.03	0.9	-1.3	-2.2	none
CAPM-WP-SUS-20-4.0	7.2	< .02	<0.01	< .02	<0.6	3.3	3.3	none
CAPM-WP-SUS-21-2.5	7.7	0.25	<0.01	0.25	7.8	11.0	3.2	none
CAPM-WP-SUS-39-2.0	5.1	< .02	<0.01	< .02	<0.6	-1.3	-1.3	none
GRAN-BG-SSS-34-0.5	6.0	< .02	<0.01	< .02	<0.6	-5.0	-5.0	none
GRAN-BG-SSS-35-0.5	6.4	< .02	<0.01	< .02	<0.6	-5.0	-5.0	none
GRAN-BG-SSS-36-0.5	6.3	< .02	<0.01	< .02	<0.6	0.5	0.5	none
LUCA-BG-SSS-19-0.5	5.7	< .02	<0.01	< .02	<0.6	-6.0	-6.0	none
MAGN-TA-SSS-15-0.5	4.8	0.53	0.20	0.33	10.3	-2.3	-12.6	none
MAGN-TA-SSS-15-0.5-100	4.7	0.37	0.23	0.14	4.4	-1.3	-5.7	none
MAGN-WP-SUS-14-3.0	5.7	1.58	0.61	0.97	30.3	12.5	-17.8	slight
MAGN-WP-SUS-14-3.0 Rep.	5.9	1.47	0.61	0.86	26.9	13.5	-13.4	slight
MAGN-WP-SSS-16-0.5	3.1	0.32	0.27	0.05	1.6	-5.3	-6.9	none
MAGN-WP-SUS-17-2.0	7.7	0.77	0.02	0.75	23.4	31.0	7.6	slight
SHER-WP-SUS-23-3.5	7.2	< .02	<0.01	< .02	<0.6	4.8	4.8	none

*Based on difference between total sulphur and sulphate-sulphur

**Based on sulphide-sulphur

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Table 2a: QA/QC for NP Determination (Modified ABA Method)

Sample	Neutralisation Potential (kgCaCO3/Tonne)	Neutralisation Potential (kgCaCO3/Tonne)
CAPM-WP-SUS-20-4.0	3.3	2.5
MAGN-WP-SSS-16-0.5	-5.3	-5.8
NBM-1 Reference (NP = 42)	39.5	-

Table 2b: QA/QC for Sulphur Speciation

Sample	Sulphur (Wt.%)	Sulphur (Wt.%)
Duplicates - total sulphur		
LUCA-BG-SSS-19-0.5	<.02	<.02
SHER-WP-SUS-23-3.5	<.02	<.02
Std. CSB (5.3%)	5.34	-
BCRI Std. (0.11%)	0.11	-
Dulpicates - sulphate sulphur		
AJAX-WP-SUS-08-1.2	0.01	0.01
MAGN-WP-SUS-17-2.0	<0.01	<0.01
BCRI 0.23% SO4-S Ref.	0.24	-

Clay Mineralogy

K/T GeoServices
Incorporated

X-ray Diffraction
Mineralogy
with Impact

www.ktgeo.com

(940) 597-9076
fax (940) 387-9980

4993 Kiowa Trail
Argyle TX 76226

September 19, 2003

Cathy Bohlke
EA Engineering, Science and Technology
12011 Bellevue-Redmond Rd, Suite 200
Bellevue, WA 98005
425-451-7400 ext. 144

Subject: X-ray Diffraction Analysis
Project No.: 1389016-0007
K/T File No.: Z03222C

Dear Cathy,

This report presents the results of clay fraction (<4 micron) X-ray diffraction (XRD) analyses performed on 7 samples. These analyses are performed to provide mineralogy of the samples.

Enclosed find the tabular XRD data (weight percentage), diffraction traces for the sample and a detailed description of sample preparation and analytical procedures. For your convenience, I have sent a copy of this report via e-mail.

Unused portions of the sample will be returned upon request. If you have any questions concerning these results or if you need anything else please contact me at (940) 597-9076.

Thank you for using K/T GeoServices to perform your X-ray diffraction analyses and I look forward to working with you again in the future.

Sincerely,

James Talbot

NOTICE: The results and interpretations presented in this report are based on materials and information supplied by the client and represent the judgment of K/T GeoServices, Inc. This report is intended for the client's exclusive and confidential use, and any user of this report agrees that K/T GeoServices, Inc. and its employees assume no responsibility and make no warranties or representation as to the utility of this report for any reason. K/T GeoServices, Inc. and its employees shall not be liable for any loss or damage, regardless of cause, resulting from the use of any information contained herein.

Mineral Definitions

Phyllosilicate (Clay) Minerals

Smectite (Montmorillonite)
A clay mineral group synonymous with the montmorillonite group. The smectite group is composed of expandable (swelling) clay minerals. The general formula for Smectite is $Al_2(Si_4O_{10})(OH)_2$. Smectites are characterized by swelling in water and extreme colloidal behavior.

Illite & Mica
Illite & Mica (muscovite) are common non-expanding (non-swelling) minerals. Illite is the fine-grained clay mineral analogue to muscovite. Illite and Mica are hydrated silicates containing potassium, silica and alumina.

Kaolinite
Kaolinite is a common non-expanding (non-swelling) clay mineral. It is a hydrous aluminum silicate with the general formula $Al_2(Si_2O_5)(OH)_4$.

Chlorite
Chlorite is a common non-expanding (non-swelling) clay mineral. It is a hydrous aluminum silicate that often contains iron.

Reference for general mineral definitions:
Dictionary of Geological Terms, American Geological Institute, 1976, Anchor Press/Doubleday, Garden City, New York.

Mineral Definitions (continued)

Rock Forming (nonclay) Minerals

Amphibole
The term amphibole refers to a mineral group. Hornblende is a common member of this group.

Goethite
Goethite ($FeO \bullet OH$) is a common weathering product of iron-bearing minerals such as siderite, magnetite, pyrite, etc.

Quartz
Quartz (SiO_2) is the most common rock-forming mineral.

Plagioclase
Plagioclase is a mineral series ranging in composition from Albite ($NaAlSi_3O_8$) to Anorthite ($CaAl_2Si_2O_8$) and is one of the most common rock forming mineral groups.

Reference for general mineral definitions:
Dictionary of Geological Terms, American Geological Institute, 1976, Anchor Press/Doubleday, Garden City, New York.

Discussion of Terminology and Limitations

Clay Fraction (<4 micron size fraction)

For purposes of this report, the clay fraction is defined as the <4 micron ESD (Equivalent Spherical Diameter) fraction of the sample. Clay fraction does not mean clay minerals (phyllosilicates) only, it is a size term and as such this size fraction can and almost always does include non-clay minerals (quartz, plagioclase, etc.). This size fraction is used because it typically contains abundant clay minerals.

Clay Fraction weight %

The <4 micron size cutoff for this fraction is based on calculated settling rates for the specific centrifuge used in the sample preparation. This is not a strict size analysis but is considered a convenient cutoff to aid in clay mineral analysis.

Data table

Data are formatted as weight percent, but are actually calculated as weight fractions. Therefore, slight rounding errors may be observed in the formatted data.

Non-crystalline (X-ray amorphous) material

XRD methods can quantify crystalline material only. Organic non-crystalline material in large concentrations can be detected but not quantified. Therefore, any organic and/or non-crystalline material is not included in the accompanying results.

K/T GeoServices, Inc., Clay Fraction XRD
Sample Preparation and Analytical Procedures

Sample Preparation

Samples submitted for clay fraction XRD analysis are first dried overnight in a convection oven at 60° C. The samples are then disaggregated using a mortar and pestle, weighed, and dispersed in a dilute sodium phosphate solution using a sonic probe. The samples are next size-fractionated using a centrifuge into bulk (>4 microns) and clay-size fractions (<4 microns equivalent spherical diameter (ESD)). The bulk fractions of each sample are dried and weighed in order to determine weight loss due to removal of clay-size materials. This weight loss is identified in the accompanying data table as "<4 Weight %." The clay suspensions (clay-size fractions) are decanted and vacuum deposited on membrane filters to produce oriented clay mounts. The oriented clay mounts are attached to glass slides and exposed to ethylene glycol vapor at 60 degrees C in a vacuum oven for a minimum of 12 hours to aid in detection and characterization of expandable clays.

Analytical Procedures

X-ray Diffraction (XRD) analyses of the samples are performed using a Rigaku automated powder diffractometer equipped with a copper X-ray source (40kV, 35mA) and a scintillation X-ray detector. The glycol solvated oriented clay mounts are analyzed over an angular range of two to fifty degrees two theta at a rate of one and one half degrees per minute.

Semi-quantitative determinations of clay fraction mineral amounts are done utilizing integrated peak areas (derived from peak-decomposition / profile-fitting methods) and empirical reference intensity ratio (RIR) factors determined specifically for the diffractometer used in data collection. The relative amounts of phyllosilicate minerals are determined from the patterns using profile-fitted integrated peak intensities and combined empirical and calculated RIR factors. Determinations of mixed-layer clay ordering and expandability are done by comparing experimental diffraction data from the glycol-solvated clay aggregates with simulated one dimensional diffraction profiles generated using the program NEWMOD written by R. C. Reynolds.

Weight Percent X-ray Diffraction Data

Project No.	1389016-0007	1389016-0007	1389016-0007	1389016-0007	1389016-0007	1389016-0007	1389016-0007
XRD#	1	2	3	27	28	29	30
Sample ID	AJAX-ST-PSD-04	AJAX-PD-SSD-06	AJAX-ST-SSD-52	MAGN-ST-PSD-01	MAGN-ST-PSD-02	MAGN-ST-PSD-03	MAGN-PD-SSD-11
<4 Weight%	2.4%	28.3%	3.2%	2.9%	2.9%	2.0%	13.2%
Smectite	17 %	16 %	3.8%	56 %	36 %	39 %	21 %
Illite & Mica	15 %	51 %	35 %	4.5%	22 %	24 %	36 %
Kaolinite	15 %	0%	14 %	0%	24 %	16 %	30 %
Chlorite	0%	13 %	0%	0%	0.5%	0.6%	0.5%
Amphibole	5.9%	0%	5.9%	9.6%	3.9%	8.8%	4.5%
Goethite	0%	20 %	0%	0%	0%	0%	0%
Quartz	36 %	0%	32 %	0%	9.1%	8.2%	5.8%
Plagioclase	11 %	0%	8.1%	30 %	4.4%	2.9%	2.7%
TOTAL	100%	100%	100 %	100%	100 %	100 %	100%

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www.ktgeo.com

(940) 597-9076
fax (940) 387-9980

4993 Kiowa Trail
Argyle TX 76226

September 26, 2003

Cathy Bohlke
EA Engineering, Science and Technology
12011 Bellevue-Redmond Rd, Suite 200
Bellevue, WA 98005
425-451-7400 ext. 144

Subject: X-ray Diffraction Analysis
Project No.: 1389013-0002
K/T File No.: Z03222D

Dear Cathy,

This report presents the results of clay fraction (<4 micron) X-ray diffraction (XRD) analyses performed on 11 samples. These analyses are performed to provide mineralogy of the samples.

Enclosed find the tabular XRD data (weight percentage), diffraction traces for the sample and a detailed description of sample preparation and analytical procedures. For your convenience, I have sent a copy of this report via e-mail.

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Laumontite
Laumontite is a zeolite mineral with the formula $Ca(Al_2Si_4O_{12})\bullet 4H_2O$.

Quartz
Quartz (SiO_2) is the most common rock-forming mineral.

Plagioclase
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Weight Percent X-ray Diffraction Data

Project No.	1389013-0002	1389013-0002
XRD#	25	26
Sample ID	GRAN-ST-PSD-53	GRAN-ST-PSD-54
<4 Weight%	2.1%	1.9%
Smectite	6.5%	8.5%
Illite & Mica	39 %	64 %
Kaolinite	5.6%	8.8%
Chlorite	2.2%	1.6%
Amphibole	3.4%	5.5%
Laumontite	0%	0%
Quartz	31 %	9.9%
Plagioclase	13 %	1.9%
TOTAL	100%	100%